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SOME UNRECOGNIZED DANGERS IN THE USE AND HANDLING OF RADIOACTIVE SUBSTANCES

WITH ESPECIAL REFERENCE TO THE STORAGE OF INSOLUBLE PRODUCTS OF RADIUM AND MESOTHORIUM IN THE RETICULO-ENDOTHELIAL SYSTEM *

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AND
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The recent report by Hoffman [1] on "Radium (Mesothorium) Necrosis" makes it necessary for us to report our unfinished observations on the danger of the accumulation of radioactive substances in the body and their effect on the hematopoietolytic systems.[2] Hoffman's contribution is based mainly on a survey, from the statistician's point of view, of some five deaths and twelve living cases, occurring among girls employed in painting the dials of watches and clocks with luminous paint. He found that they developed a very resistant infection of the jaw, with buccal lesions and marked anemia. His idea was that a distinct occupational poisoning had occurred, the paint entering the body by way of the gastro-intestinal tract as a result of the habit of pointing in their mouths the tips of the brushes used in painting.

The recent illness and death of one of these patients gave us the opportunity, for the first time, of obtaining accurate clinical and pathologic data for this study. In addition, we have under our observation cases ranging in severity from mild ones, showing only slight necrosis of the alveolar borders and without anemia or leukopenia, to severe ones, showing profound anemia with extensive, almost complete destruction of the upper and lower maxilla. In the fatal case we have demonstrated, by means of electrometers, gamma radiation from the body during life and measurable amounts of emanation in the expired air. In the organs after death, amounts of radioactive elements were found, sufficient to be determined quantitatively by alpha radiation and penetrative gamma rays, notably in the spleen, liver and bones, which represent the largest part of the reticulo-endothelial system.

It will be several months before quantitative readings can be completed on these organs and the lesions produced in animals, but we are satisfied that they contain a mixture of mesothorium, with its decaying products, and radium, in what appears to be lethal quantities. In another case, in which there is a well marked anemia, we have shown emanation in the expired air in large and measurable quantities coming from actual deposits of mesothorium and radium in the body, the blood giving off emanation while passing through the lungs. In three other workers, who show at present (Sept. 9, 1925) little or no clinical symptoms and are apparently healthy, we have demonstrated radioactivity in the expired air. In several pieces of necrotic bone removed during life from the lower jaw of a radium worker, we have demonstrated a considerable amount of alpha radiation. This girl died about three years ago of a supposed syphilitic osteomyelitis of the jaw, with profound anemia and sepsis. The dentist kept the pieces of bone because of their unusual size.

This report is published now as a warning that when long lived radioactive substances are introduced into the body, either by way of the gastro-intestinal tract (as they were in these cases), or by way of intravenous injections for therapeutic effects (as is being advocated for the treatment of such conditions as gout, arthritis, arteriosclerosis, leukemia and Hodgkin's disease), death may follow a long time after, from the effects of constant irradiation on the blood-forming centers. Minute particles of the radioactive substances are phagocyted by the local and migratory histocytes of the reticulo-endothelial system and are deposited in the bones, spleen and liver in sufficient amounts to produce, for a period of time, seemingly curative or stimulative reactions, to be followed later by exhaustion and destruction of the blood-producing centers.

Radioactive elements are among the most powerful known agents affecting the hematopoietic system. From the moment of introduction into the body by any channel, they act spontaneously and, according to the element and its quantity, irritate the blood-producing centers to various degrees. Small doses increase temporarily red and white cell production. After a shorter or longer time, small or larger doses cause partial or almost total destruction of leukocytes and a diminution in the erythrocytes, producing a severe anemia that simulates the pernicious anemias of regenerative and aplastic types.

RADIOACTIVE LUMINOUS MATERIAL

The first phosphorescent materials were produced in Europe. After the discovery of radium, phosphorescent zinc sulphid or artificial Sidot-blende activated by

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1. Hoffman, F. L.: Radium (Mesothorium) Necrosis, J. A. M. A. 85: 961 (Sept. 26) 1925.

2. We have coined the word hematopoietolytic to designate two very important and distinct systems: first, the hematopoietic system, which is composed of the erythroblastic, leukoblastic, thromboblastic and lymphoblastic centers, situated, in the adult, chiefly in the marrow, lymph nodes and spleen, and which forms the main elements of the blood; second, the lytic or reticulo-endothelial system, situated mainly in the same organs, but separate from and adjacent to these centers, the chief function of which is the destruction of erythrocytes and the phagocytizing of foreign particles in the blood by means of its chief cell, the histocyte.

the addition of small amounts of radium was used in Germany on watch dials for night visibility. Owing to difficulties in the production of these phosphorescent materials, such products were more or less scientific curiosities, and from 1908 to 1912 were used only in Germany and Switzerland on high class watches. They were not used in the United States until 1913, when there was produced here an article superior to any prior European product. This made possible the development of a large and important American industry for the economic illumination of any desired instrument or object for visibility at night. Since then the industry has employed many hundred men and women in laboratories and plants either producing or applying radioactive phosphorescent material to watches, clock dials, electrical appliances, compasses and aeronautic instruments.

The so-called luminous material consists of crystalline zinc pyrosulphid mixed with various proportions of radium, mesothorium or radiothorium in order to obtain the desired amount of luminosity. According to the U. S. Bureau of Standards and others, radioactive material, depending on its use, contains various proportions of radioactivity, the highest being 1 mg. of radium element or its equivalent to 8 gm. of the zinc sulphid. Paint applied to watches and clocks contains an average of 1 mg. to from 30 to 40 gm. of zinc sulphid.

In this country, at the beginning of the industry, the zinc sulphid was rendered luminous by activation with radium. Later, however, for economic reasons and because of greater practical luminosity, mesothorium and radiothorium were substituted for the more expensive radium. This is of great importance from the toxicologic standpoint. Mesothorium in equilibrium with its radiothorium emits five alpha particles, whereas radium emits only four. The alpha particles of mesothorium and its decayed products have a greater velocity and penetration than those of radium, and therefore are chemophysically and physiologically more active. This fact has been recognized in the therapeutic use of thorium X (by-product of mesothorium), which is more irritating to the blood-forming centers than any other known radioactive element.

The patients in this report have ingested luminous paint, composed of zinc sulphid rendered luminous by activation with about 20 per cent. radium and 80 per cent. mesothorium. The mesothorium contains radiothorium in equilibrium or artificially added to obtain maximum ionization and degree of luminosity.

MODE OF INTRODUCTION

The histories of the workers affected all show that they had worked almost constantly at painting dials for from three to seven years. They painted from 250 to 300 watches a day. It was their practice, for several years and until they were warned to stop, continually to point with their lips the camel's hair brushes which they used. The minimum number of times this was done a day would be about once to a dial, and if the brushes were poor, the maximum might be about fourteen times to a dial. If the brush, when loaded, holds about 5 mg. of luminous paint, on licking, 1 mg. or less, a hardly visible amount, might easily stick to the gums or the roof of the mouth. As the material is mixed with a binder of gum acacia, it is sticky and hard to expectorate. One girl stated that it was gritty and that she always swallowed it. As a working basis, therefore, we can formulate the following: Suppose only 0.5 mg. of paint sticks to the mouth on each pointing of the brush, a worker licking her brush once for each dial and painting 250 watches a day would ingest a minimum of about 125 mg. of paint. If the worker pointed the brush a maximum of fourteen times per dial (and one girl stated that she often licked her brush twice for each watch figure) she would ingest about 1.75 gm. per day. Therefore, it is possible to state that a worker could actually ingest from 125 mg. to 1.75 gm. daily, which would contain from 3 to 43 micrograms of radioactive substances. Working only six months a year, and only five days a week, from 360 micrograms to over 5 mg. of radioactive substances could be swallowed in that time. With an employee working from five to six years, we may easily calculate on a deposit in the bones, spleen, and liver of 1 mg. or more of radioactive elements, allowing for great elimination by way of feces. Thus it appears that these operators were exposed to and could ingest and absorb greater amounts of radioactive elements than are ever given in expectation of therapeutic results. An amount of thorium X of gamma radiation equal to that of 100 micrograms of radium element given either in one dose or split in three has been lethal in sixteen days for an adult.

FATAL CASE

CASE 1.—*Rapidly progressing anemia of the pernicious type with leukopenia and terminal infection. History.*—A woman, aged 35, started work as a dial painter, in October, 1917, and was in the habit of pointing brushes with her lips innumerable times a day. In 1923, as a result of instructions issued in the factory, she stopped pointing her brushes. She was quite well at this time except for neuralgia-like pains in the left leg. In 1924, these pains became so severe that she had to use a cane in walking. In March, 1925, she developed a condition simulating pyorrhea and stopped work as a dial painter. She was in fair health until June, 1925 (three weeks before death), when she noticed that she bruised easily. One week later her teeth became sore, and the gums started to bleed. She felt very weak. One week before death, she appeared very anemic, weak and prostrated. For the first time she had pronounced gingival lesions, and the parotid gland on the left side was swollen, hot and tender. Smears from the mouth showed Vincent's organisms and many gram-positive cocci. The hemoglobin was 33 per cent.; erythrocytes totaled 1,400,000; the index was one plus; the leukocytes were 400 per cubic millimeter, with polymorphonuclears 40, lymphocytes 58, and histocytes, 2 per cent. The red cells showed a profound anemia characterized by a large cell anisocytosis, fully one fourth of the cells being macrocytes; polychromatophilia was moderate; granular basophilia was rare. There was an occasional normoblast and a rare megaloblast. The platelets were very markedly diminished. The intense leukopenia was characterized by the presence of a few cells of the myeloblastic and leukoblastic series, the lymphocyte of the normal blood being the predominating cell. The blood serum showed an icterus index of 4.3 (normal, from 4 to 6), and both direct and indirect van den Bergh tests were negative. She was admitted to the medical service of St. Mary's Hospital, Orange, N. J.

Examination.—The patient was found to be acutely ill; the temperature was 102 F.; the pulse, 120, and the respirations, 20. There was marked prostration. The weight was 140 pounds (63.5 kg.) and the height, 65 inches (165 cm.). The systolic pressure was 105 and the diastolic, 65 mm. of mercury. There were marked lesions of the mouth and gums, with bleeding. There was beginning necrosis of the soft palate, gums and cheeks, extending down to the glottis. The skin was pale, and there was no icterus. There were a few large purpuric areas over the lower extremities. The pupils were equal and reacted. The ears were negative. The apex of the

heart was in the fifth interspace in the midclavicular line, and there was a soft hemic murmur over the base of the heart. The lungs were clear; the liver and spleen were not palpable. There were no palpable masses in the abdomen; the rectal examination was negative. There were no palpable lymph nodes, except those in the left side of the neck. The reflexes were normal, and there was no clonus or Babinski phenomenon.

Course.—The patient was in the hospital seven days before death. During this time her temperature remained over 101 F. and would reach from 103 to 106 in the evenings. She was profoundly toxic, and toward the end, delirious. At no time were any localized nervous symptoms found. The blood examinations are given in Table 1.

The blood Wassermann reaction was negative. The urea nitrogen was 18 mg.; creatinin, 1.4 mg.; sugar, 128 mg. per hundred cubic centimeters of blood; chlorids were 0.536 per cent. of whole blood. The ionic calcium was diminished. The urine on several examinations showed albumin from 1 to 3 plus, no sugar, no acetone bodies and many hyaline and faintly granular casts, with at times considerable blood (voided specimens). The patient became progressively more septic, and toward the end showed marked sloughing of the roof of the mouth and the posterior pharynx, extending down as far as could be seen. Large areas of ecchymoses and purpuric areas like a toxic purpura appeared over the lower extremities and on the abdomen. The mouth bled as in acute leukemia. She became delirious and died.

TABLE 1.—*Blood Examinations in Case 1*

Day	Hemoglobin, per Cent.	Red Blood Cells	White Blood Cells	Polymorphonuclears, per Cent.	Lymphocytes, per Cent.	Histiocytes, per Cent.	Eosinophils, per Cent.
12	24	1,344,000	900	52	46	1	1
13	20	1,064,000	840	33	63	4	0
13	Blood transfusion, 750 c.c. of blood, Lindeman method, and 250 c.c. of modified Ringer's solution						
15	30	1,474,000	760	30	70	0	0
16	28	1,424,000	840	33	65	2	0
17	26	1,440,000	880	20	80	0	0
17	Death						

Electrometer Tests Made During Life.—Since the history of the patient's prior occupation, together with the clinical and pathologic picture, indicated radioactivity as a causative agent in her illness, an attempt was made to determine whether it could be demonstrated during life. Tests were made, therefore, to determine penetrative radiation from her body, and to ascertain whether her expired air might contain emanation. The electrometer used in the tests is a specially constructed one of the Wulf type with a silvered quartz thread. It is of very small electrostatic capacity and by the emanation method can be read quantitatively to 0.001 microcurie. This was placed about 18 inches from the chest of the patient and 9 inches above the level of the bed. Readings were then made and showed the following readings: normal leak before test, 10 subdivisions per hour; total leak during test, 14 subdivisions per hour. The difference of four subdivisions per hour was caused by penetrative radiations coming from the body of the patient. The patient was then instructed to pass her expired air, by means of a rubber tube, through two large Woulfe bottles, containing phosphorus pentoxid for absorption of moisture, into the ionization chamber of the electrometer. As she was very exhausted, she could not do this well, and the expired air had to be drawn into the chamber by attaching an aspirating bulb to the second stopcock of the electrometer. This was kept up for five minutes. The stopcocks were closed, and these readings were made: normal leak before test, 5 subdivisions in thirty minutes; total leak with expiratory air in chamber, 20.4 subdivisions in thirty minutes. The difference of 15.4 subdivisions in thirty minutes is due to ionization produced by emanation in the expired air. Fractional readings during the first half hour and readings at the end of two hours show increasing leak due to the growth of the active deposit with characteristics of the radium parent. This, together with the fact that all precautions were taken as to drying the air before introducing it into the chamber of the instrument and that the temperature of the introduced air was about the same as that in the chamber, proves definitely that the leak was not due to any other reason than the presence of emanation.

Necropsy Findings.—Necropsy was performed nine hours after death. The body was not embalmed. It was well preserved and symmetrical; the skin was very pale and waxy in color. The left lower extremity was 4 cm. shorter than the right, and there were many purpuric areas over both lower extremities. The mouth was filled with old, dark clotted blood. Six front teeth in the lower jaw were loose, and a large amount of pus could be squeezed from the gums. The hard and soft palates were covered with sloughing mucous membrane. The left parotid gland was slightly enlarged, and on section, showed no suppuration. Lymph nodes in the left submental region were slightly enlarged, but on section showed no suppuration. The lower jaw was removed in toto and showed beginning necrosis along its alveolar borders. The body of bone was normal. The base of the tongue, the glottis and the epiglottis were free. The trachea showed a few small mucosal hemorrhages. Dissection of the neck showed no suppuration. The subcutaneous fat of the body was well preserved and the muscle tissue a pale red. The abdominal viscera were in their normal position; the mesentery of the small intestine showed a few purpuric hemorrhages. The pleural cavities showed a few old adhesions over the right upper lobe. The pericardium, endocardium and valves were free. The heart muscle was of normal thickness and was a pale yellowish red with indistinct bundles. There were occasional small hemorrhages in the myocardium. The aorta showed a few yellowish, noncalcified streaks of atheromatosis. The coronaries were free. The left lung showed moderate terminal frothy edema and a few petechial hemorrhages in the visceral pleura over the posterior borders. The mucosa of the larger bronchi was pale. The right lung was the same as the left. There was a healed tuberculous reinfection near the apex of the right upper lobe, and a small, calcified primary affect beneath the pleura in the middle of the upper lobe, with the small calcified regional hilium gland. The spleen was slightly enlarged, reddish gray and wrinkled, and measured 14.5 by 8 by 3 cm. There was a slight capsular thickening over the lower pole. On section, the lymphoid tissue was hardly visible; the pulp was a light red and was firm. The suprarenals were of normal size and conformation, with normal lipoidal content in the cortex. The kidneys were normal in size and conformation. The capsules stripped easily, leaving a finely granular surface with an occasional small retention cyst. The cortex in some places was thinner than normal, having a relation to the medulla of 1 to 5. The pelvis showed a few small petechial hemorrhages. The liver was normal in size and conformation. On section, it showed a pale reddish ocher surface, with indistinct markings. The gallbladder was free and clear. The stomach showed innumerable small hemorrhages in the mucosa. The small intestines were free and the lymphoid elements hardly visible. The uterus showed a thickened, dark red endometrium. The tubes were free, as was the urinary bladder. The bone marrow of the lumbar vertebra was light red, with areas of very dark red. Both femurs were removed and split lengthwise; they showed a replacement by dark red marrow throughout the entire shaft. The left femur was about 4 cm. shorter than the right, owing to the fact that its neck formed an angle of 90 degrees with the shaft, but there were no gross pathologic changes. The anatomic diagnosis was anemia of the pernicious type, necrosis of the jaw and sepsis.

Electrometer Tests on Viscera and Bones.—Important organs were chopped up and dried over a sand bath to a slight charring, and pulverized and incinerated in the electric oven at low heat, most organic matter being driven off. Bones were sawed in small pieces and organic matter was burned off in the incinerator. The organs after reduction to ash were placed in bottles and sealed. Bottles containing the incinerated organs, including practically the entire liver, spleen, kidneys, heart and marrow from femurs and lumbar verte-

brae were placed around the gamma ray electrometer and readings made. They showed small, but definite penetrative radioactivity. The lower jaw and both femurs showed considerable penetrative radioactivity. Check tests were made on these organs by Mrs. Quimby in the Research Laboratories of the Memorial Hospital, New York. She used an alpha electrometer with a foil leaf, the dried organs being placed in the lower compartment. The normal leak in this case was the time it took the foil to go across the entire microscopic scale. The following readings were made:

Liver: Normal leak 2 minutes, 20 seconds; leak during test, 2 minutes.

Bone marrow: Normal leak, 2 minutes, 18 seconds; leak during test, 1 minute, 15 seconds.

Spleen: Normal leak, 2 minutes, 21 seconds; leak during test, 26 seconds.

Bone cortex: Normal leak, 2 minutes, 18 seconds; leak during test, 1 minute, 21 seconds.

All the material, including the inferior maxilla and the two femurs, was then placed near the gamma electrometer and the following readings were made: normal leak, 28 minutes; leak during test, 22 minutes, 43 seconds.

Positive gamma radiation was therefore present in the organs and alpha radiation was most marked from the spleen, bone marrow, cortex of bone and liver.

Further tests with the alpha ray electrometer showed almost no radioactivity in the lungs, heart or kidneys. The gastro-intestinal tract was unfortunately not examined.

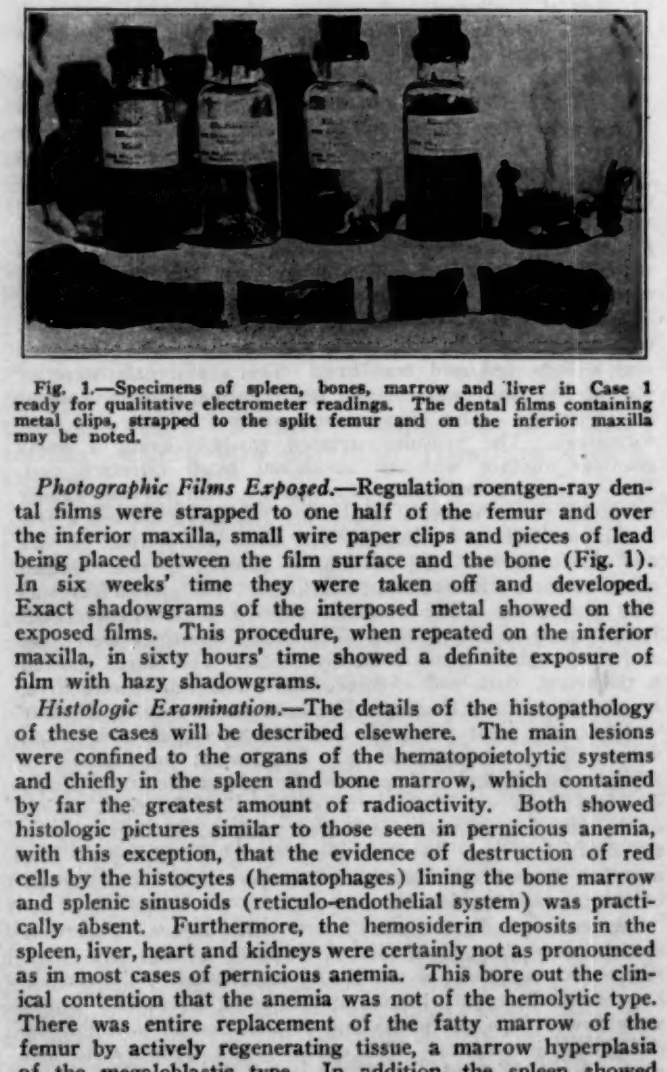

Fig. 1.—Specimens of spleen, bones, marrow and liver in Case 1 ready for qualitative electrometer readings. The dental films containing metal clips, strapped to the split femur and on the inferior maxilla may be noted.

Photographic Films Exposed.—Regulation roentgen-ray dental films were strapped to one half of the femur and over the inferior maxilla, small wire paper clips and pieces of lead being placed between the film surface and the bone (Fig. 1). In six weeks' time they were taken off and developed. Exact shadowgrams of the interposed metal showed on the exposed films. This procedure, when repeated on the inferior maxilla, in sixty hours' time showed a definite exposure of film with hazy shadowgrams.

Histologic Examination.—The details of the histopathology of these cases will be described elsewhere. The main lesions were confined to the organs of the hematopoietolytic systems and chiefly in the spleen and bone marrow, which contained by far the greatest amount of radioactivity. Both showed histologic pictures similar to those seen in pernicious anemia, with this exception, that the evidence of destruction of red cells by the histocytes (hematophages) lining the bone marrow and splenic sinusoids (reticulo-endothelial system) was practically absent. Furthermore, the hemosiderin deposits in the spleen, liver, heart and kidneys were certainly not as pronounced as in most cases of pernicious anemia. This bore out the clinical contention that the anemia was not of the hemolytic type. There was entire replacement of the fatty marrow of the femur by actively regenerating tissue, a marrow hyperplasia of the megaloblastic type. In addition, the spleen showed atrophic malpighian follicles, some of the terminal arterioles having hardly any surrounding lymphocytic mantle. There was diffuse fibrosis and slight increase in hemosiderin pigment. The liver parenchyma presented a small amount of hemosiderin pigment in the outer portions of the lobule and in some of the Kupffer cells throughout the lobules. There was no extensive fatty infiltration. There is absence of the collections of lymphocytes seen in the periportal spaces in most livers and the periportal structures are encased in a noncellular fibroblastic tissue, which fibrosis does not extend into liver parenchyma. In view of the fact that the bile may be an important channel in the elimination of radioactivity, the stagnation of radioactive bile may account for the fibrosis around the periportal space.

In certain respects this case may be said to resemble pernicious anemia. Our concept of pernicious anemia is that the unknown toxin or etiologic agent responsible for the disease causes increased activity of the histocytes of the hemolytic or reticulo-endothelial system, especially of those cells in the sinusoids of the marrow, spleen and liver (hematophages). This increase in phagocytic activity of these cells destroys red cells faster than they can be formed by the hematopoietic system, and as a consequence the blood serum becomes icteric as a result of a hyperbilirubinemia, and the indirect van den Bergh test is often positive owing to increased hemolysis. Pernicious anemia is essentially a hemolytic anemia.

The blood in this case showed a profound anemia, characterized by a large cell anisocytosis, by the presence of megaloblasts and by a marked leukopenia. There was not, however, a hyperbilirubinemia, and the van den Bergh tests were negative. The anemia is, therefore, not a hemolytic anemia. It is not an aplastic anemia, since there is marked embryonal blood formation. The fault lies in a long continued irritation of the hematopoietic system, the hemolytic or reticulo-endothelial system being unaffected. There is a stage of stimulation followed later by sudden exhaustion of the erythroblastic and leukoblastic centers with the production of a rapid, fatal anemia with leukopenia, which fails to be influenced by any form of treatment.

The clinical picture is distinguishable from pernicious anemia by its rapid course, its lack of remissions, the absence of nervous and gastro-intestinal symptoms, and the presence of buccal lesions with necrosis of the jaw similar to that seen in the acute leukemias. The morphologic blood picture is indistinguishable from that of pernicious anemia except for the presence of a thrombopenia sufficient to cause purpura and bleeding. Thrombopenia occurs in pernicious anemia, but is not common. The marked replacement of fatty marrow in the femurs by bright red regenerating marrow is almost pathognomonic of true addisonian anemia. In fact, we know of no other disease characterized by such marked regeneration.

As to the etiology, we feel that we have proved by the demonstration and measurement of radioactive substances in the body during life, in the expired air and in the organs after death that the anemia in this case is dependent on the ingestion, long before, of radioactive paint, and that it is caused by the actual deposits in the spleen, bones and liver of radium and mesothorium with their decayed products. For the foregoing reasons we have designated this anemia as a "rapid anemia of the pernicious type due to radioactivity." Radioactivity in the bones is very clearly shown by the exposure on the dental films.

SEVERE CASE IN PERSON STILL LIVING

CASE 2.—*Local lesions with bone necrosis; chronic leukopenic anemia of the pernicious type. History.*—A woman,

aged 24, was admitted to the medical service of St. Mary's Hospital in May, 1925, suffering from a chronic anemia with extensive necrosis of the inferior maxilla. She had worked for seven years as a dial painter, during which time she pointed brushes with her lips. About two years before, she had trouble with her teeth and had some extracted. Since that time she has had a persistent, progressive necrosis of the lower jaw, has been anemic and run down, has lost weight and has had intermittent pains in the legs. During the last part of 1924 she was treated in a hospital in Philadelphia for

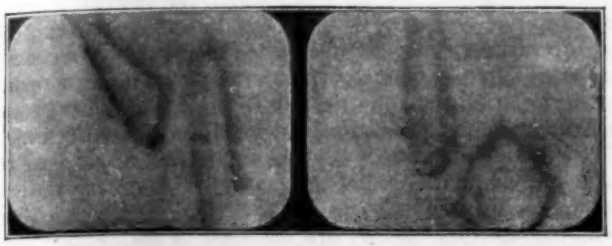

Fig. 2.—Dental films removed from femur in Case 1 after being strapped against bone for six weeks. The exact shadowgrams of metal clips may be noted.

necrosis of the lower jaw of undetermined etiology, and blood transfusion was done without benefit. She returned home and was treated by her family physician up to the time of her admission to the hospital. Her mouth condition was treated with local washes, and hypodermics of iron were given for the anemia.

Examination.—The patient was markedly emaciated, anemic and chronically ill, and weighed about 90 pounds (41 kg.). There was a pronounced general pallor. The mouth showed extensive necrosis of the lower and upper jaws, with a fracture of the lower jaw on the right side about the middle of the body. There was marked suppuration about the gums, and most of the teeth were missing or loose. There was a sinus communicating with the right antrum. The hearing in both ears was greatly impaired. The pupils were equal and reacted. The apex beat was in the fifth space, inside the nipple line, with a soft systolic murmur over the pulmonic area. The pulse was small, rapid and irregular. The systolic pressure was 105 mm. of mercury. The lungs were normal. There were no palpable lymph nodes. The spleen and liver could not be felt. The extremities were normal. The reflexes were normal, and there was no clonus of any sort or Babinski phenomenon.

Morphologically, the blood picture was characterized by a profound anemia, in which the color index was usually one plus, by a large celled anisocytosis with many macrocytes, by

TABLE 2.—*Blood Examinations in Case 2*

Hemoglobin, per Cent.	Red Blood Cells	Index	White Blood Cells	Polymorphonuclears, per Cent.
20	964,000	Minus	2,400	64
	Blood transfusion 650 c.c. by direct method			
32	1,932,000	Plus	2,600	69
34	1,984,000	Plus	2,640	56
28	1,544,000	Plus	3,000	61
30	1,664,000	Plus	2,480	60
24	980,000	Plus	2,100	65

slight polychromatophilia and occasional granular basophilia, and by the occurrence of a scant number of nucleated reds and a rare megaloblast. Blood platelets were abundant in smears; there was no purpura or bleeding. The various blood examinations are given in Table 2. The icterus index was 5, showing no hyperbilirubinemia. Both direct and indirect van den Bergh tests were negative. The blood coagulation time was thirteen minutes by the intravenous method; the bleeding time was normal. There was no increased fragility of red cells. The urea nitrogen was 12 mg.; the uric acid, 2.2 mg.; the creatinin, 0.9 mg., and the sugar, 90 mg. per hundred cubic centimeters of blood. The blood chlorids were 494 per cent. whole blood. The total calcium was 9 mg. per hundred cubic centimeters. The blood Wassermann reaction was negative. Frequent urine examinations showed a faint trace of albumin and an absence of sugar; microscopic examination showed an occasional hyaline cast.

Course.—The patient is still in the hospital. For many weeks she showed slight improvement. At the present time she presents a great necrosis of both jaws, the mouth being kept clean by frequent washes and expert dental attention. In this way she suffers only periodic rises in temperature, the temperature usually staying around 99 F. Her lower jaw shows a spontaneous fracture through the body on the right side, and there is necrotic perforation of the hard palate. She presents a picture of a severe local infection which seems to be well controlled, with a profound anemia of the pernicious type with leukopenia.

Electrometer Tests.—The patient passed her expired air by means of a rubber tube through a series of moisture absorption bottles containing sulphuric acid and calcium chlorid into the ionization chamber of the electrometer for a period of five minutes. The stopcocks were then closed and readings begun. They showed the results given in Table 3.

There is a much greater leakage during the first and second ten minute periods than thereafter. This is due to the fact that the expired air contains a mixture of emanation originating from mesothorium with its decayed products and radium. Definite proof exists in this case of positive radioactivity from the expired air.

TABLE 3.—*Electrometer Tests in Case 2*

33.5	subdivisions	in	1st 10 minutes
16.2	subdivisions	in	2d 10 minutes
15.7	subdivisions	in	3d 10 minutes
16.6	subdivisions	in	4th 10 minutes
17.7	subdivisions	in	5th 10 minutes
99.7	subdivisions	in	50 minutes
Normal leak 8.5	subdivisions	in	50 minutes

In this case, instead of the development of an acute anemia, we can recognize from the clinical history and course an overstimulative period characterized by loss of weight, bone pains and neuritis, followed by an exhaustion period in which there is first a local irritation at the point of entry (mouth) of the radioactive substances. A gingivitis develops, followed by loosening of the teeth, requiring extraction and then an unhealing necrosis of the jaw. An anemia, with a leukopenia without thrombopenia and low blood pressure, gradually develops until there is reached a chronic stage of a profound anemia of the pernicious type, with extensive localized lesions of the mouth and necrosis of almost the entire lower and upper jaws. The patient is liable to death from any intercurrent infection, especially meningitis, or may die from the progressive uninfluenced anemia. The anemia is of the same type as in the first case, but chronic. It is not a hemolytic anemia, nor is it an aplastic anemia. It is due to exhaustion of blood-forming centers, caused by radiation from fixed deposits of mesothorium and radium in the blood-forming organs.

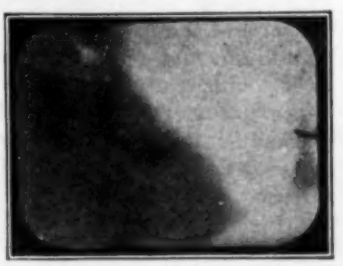

Fig. 3.—Dental film removed from the femur in Case 1 after six weeks' exposure. The exact shadowgram of metal blade of detachable scalpel may be noted. The film is fogged by contamination with oil from the bone.

REPORT OF HEALTHY CASE

CASE 3.—*Exposure, with storage in body of radioactive substances, but without apparent effect on health. History.*—A woman, aged 26, was employed as a dial painter and later became an instructor, teaching other girls how to apply the paint. She also painted samples. She always operated with very good brushes and did not pass the brush over the lips and in the mouth as often as other girls. She would lick the brush perhaps once or twice for every two watches.

Examination.—The patient weighed 113 pounds (51 kg.), was 63 inches (160 cm.) tall and did not appear ill. Her general physique was good. There was a slight projection of the inferior angles of the scapulae, and some pain over the left scapula. She had had two teeth extracted for so-called pyorrhea, which was followed by a slight necrosis of the alveolar border. The jaw eventually healed. The pupils were equal and reacted. There were no palpable lymph nodes. The systolic blood pressure was 118, and diastolic 85. The lungs and heart were normal. The liver and spleen could not be felt. The reflexes and the extremities were negative. The physical examination showed no serious defect in any of the organs. The hemoglobin was 80 per cent., the red cells, 4,184,000, and the leukocytes 11,400, with polymorphonuclears 74 per cent. There were no pathologic red or white cells.

Electrometer Tests.—The patient passed her expired air for five minutes through drying bottles into the ionization chamber of the electrometer. Stopcocks were then closed and the readings given in Table 4 made.

TABLE 4.—*Electrometer Tests in Case 3*

13.2	subdivisions	in	1st 20 minutes
8.0	subdivisions	in	2d 20 minutes
7.8	subdivisions	in	3d 20 minutes
7.0	subdivisions	in	4th 20 minutes
6.0	subdivisions	in	5th 20 minutes
42.0	subdivisions	in	100 minutes
Normal leak 20.0	subdivisions	in	100 minutes

The increased leak in the first twenty minutes is due to decaying mesothorium. The leaks thereafter represent a constant emanation from radium.

This girl, like many others, had a history of exposure to radioactive paint. She ingested radioactive elements during her occupation, enough in fact to cause her blood to throw off emanation by way of the expired air and in measurable quantities, long after she ceased work. Her general physical condition is good and she could at the present time pass a strict medical examination and obtain almost any amount of insurance. Yet she has active deposits of insoluble products of radium and mesothorium in her bones, spleen and liver, which are constantly bombarding her blood-forming centers. Who can tell when she may develop an acute fatal anemia, or a more chronic anemia, with or without local lesions and bone necrosis? She has no severe anemia at present and no leukopenia. She has had neuralgia-like pains and has lost two of her teeth, with a small amount of necrosis of the jaw which under dental care has healed.

SUMMARY

A. *Exposure to Radioactivity.*—The human body may be exposed to radioactivity with deleterious effects in one or more of four main ways:

1. By Penetrative or External Radiation: We have abundant clinical evidence, supported by animal experimentation, of the harmful effects of overexposure, or long continued exposure, to external irradiation by means of the roentgen rays, radium, mesothorium, etc. (roentgen ray or radium and its allied products produce essentially the same biologic effects). The numerous reports of roentgen-ray dermatitis, radium burns, the temporary and fatal anemias in radiologists and radium workers, intestinal injuries and sterility due to atrophic effects on the gonads, all demonstrate the occupational hazards likely to be encountered. Brulé and R. Boulin [3] state that only a few cases of pernicious anemia due to radium can be found in literature, but this severe disease is without doubt more frequent than published reports indicate. We ourselves know of two deaths from severe anemia among radiologists, which have never been reported in literature. Aubertin states that there is a whole group of professional pernicious anemias due to roentgen ray, radium and mesothorium, and that they are of the aplastic type and can be produced experimentally. N. Fiessinger reports that Dominici succumbed to an aplastic anemia due to the habit of carrying radium packages in his pockets. P. Emile-Weil states that long continued doses of roentgen rays, radium or mesothorium are needed to cause these professional anemias. Carman [4] states that Tiraboschi, an Italian roentgenologist, died of an essential anemia due to exposure to roentgen rays. Mottram,[5] in 1920, reported three deaths in radium workers from anemia. We may conclude, therefore, that many cases of fatal anemia have been recognized by clinicians as being caused by exposure to roentgen ray, radium, mesothorium and their allied products. While this suspicion has experimental support, it has never been proved as in the cases herein reported.

2. By Inhalation of Dust Containing Radioactive Substances or by Inhalation of Emanation: There are certain manipulations required in the radium industry, such as tubing and retubing of partly aged radium material, repairing needles, plaques and containers, the preparation of radium and mesothorium and their decaying products for the manufacture of luminous paint, the retubing of needles and the brushing of dishes in which the chemist or worker cannot be properly screened or protected from radioactive dust, or from inhalation of emanation. We ourselves know of deaths from anemia in which this mode of entry played the important etiologic rôle.

3. By Swallowing of Radioactive Substances: In the cases reported in this paper, the mode of entry was through the mouth. As a result of the habit of pointing and licking the brushes used in painting dials, minute particles of the paint stick to the gums, teeth and roof of the mouth, and produce local irritation, setting up in some cases gingivitis, dental infection of a peculiar intractable type and bone necrosis. Most of the paint is ultimately swallowed, and a considerable amount is absorbed by way of the gastro-intestinal tract. Local and migratory histocytes, owing to their marked phagocytic activity for foreign particles, carry these almost colloidal sized particles to the main organs of the reticulo-endothelial system, chiefly the bones, marrow, spleen and liver. There they are deposited, some 80 per cent. of the deposited elements remaining without possibility of ever being eliminated, changed or neutralized, and constantly emitting their charac-

3. Brulé, M., and Boulin, R.: Un cas d'anémie aplastique provoquée par le radium, Bull. et mém. Soc. med. d. hôp. de Paris, **49**: 528 (March 27) 1925.

4. Carman, R. D., and Miller, A.: Occupational Hazards of Radiologist, with Special Reference to Changes in Blood, Radiology **3**: 408-419 (Nov.) 1924.

5. Mottram, J. C.: Histological Changes in Bone Marrow of Rats Exposed to the Radiations from Radium, Arch. Radiol. & Electrotherap. **25**: 197 (Dec.) 1920.

teristic radiations until they decay years afterward according to their individual life history. These deposits always produce irritative effects. For a considerable time these effects may be thought to be beneficial, as they produce a stimulative period in which there is an increase of both erythrocytes and leukocytes, with perhaps better health. This is followed by a period of overstimulation in which there is loss of weight, low blood pressure, bone pains and apparent neuritis, with beginning reduction in red cells and a leukopenia. An exhaustion period is finally reached, perhaps years after the actual deposition of radioactive elements, in which there is marked leukopenia and either a rapid fatal anemia of the pernicious type or a more chronic anemia, with or without local lesions in the form of bone necrosis and buccal infection. Terminal infections may end life.

4. By Intravenous Injection of Radioactive Substances: For intravenous therapeutic injections, the soluble bromids or chlorids of radium, mesothorium and radiothorium are most used. The first two elements behave the same as barium salts when injected into the blood stream. After reaching the blood, they are precipitated into the insoluble sulphates and accumulate in the organs of the reticulo-endothelial system as fixed deposits.

B. *Effects of Radioactivity When Introduced Into Body.*—Radioactive elements emit so-called positive, negative and neutral (gamma) radiations of which positive charged alpha particles represent over 80 per cent. of the total radium energy. This positive or alpha radiation produces very definite and important chemophysical effects. It is primarily disruptive. It disrupts molecules of any inorganic or organic salt. For example, it decomposes water into hydrogen and oxygen and hydrogen dioxid, and hydrochloric acid into chlorin and hydrogen. Therefore, radioactive elements in so small amounts that beta and gamma radiations are almost negligible, still produce, through their alpha radiation, intense physiologic effects, if given by mouth or by vein. Introduced into the body they form fixed deposits in the main organs of the reticulo-endothelial system, chiefly the spleen, bones, marrow and liver. Here they continuously emit radiations until they decay according to their individual life history. Primarily, in these situations, they act as irritants to the adjacent erythroblastic and leukoblastic centers. They also depress the blood pressure mechanism. Their intensity and physiologic effect vary with the dose introduced and the number and velocity of alpha particles that they emit. The therapeutic use of radioactive substances for the treatment of anemias by introduction into the body through mouth or vein has been based mainly on a supposed stimulative period, in which there was a temporary increase in red and white cells. This, however, is really an irritative phenomenon and is followed in time by overstimulation and exhaustion with consequent anemia and leukopenia. The cell destroying property of radioactive elements has been used to reduce the number of leukocytes in leukemias by internal or intravenous administration of various radioactive preparations. The foregoing characteristics of radioactivity have been recognized and cited by many authorities. Cumulative effects of doses repeated too often over a short period of time, say of two or three months, have also been recorded. Several deaths due to aplastic anemia with almost complete destruction of blood centers, have occurred when thorium X was given for therapeutic reasons. Apart from the specific effect of radioactivity on the blood-forming apparatus, described above, radioactivity has not proved to be a specific therapeutic agent in any condition in internal medicine.

There have been scant, if any, reports, however, concerning the late effects of radioactivity on the body, which are the important and directing factors in radiotherapy. The cases reported in this study demonstrate the importance of, and the possible tragedy due to, the late and largely underestimated effect of radioactivity.

EFFECTS OF RADIOACTIVITY INTRODUCED INTO BODY

SINGLE LETHAL DOSE

1. Local Effect:
   Destruction of local tissue.
2. Generalized Effect:
   Spontaneous anemia with leukopenia, no stimulative period.

SMALL, OFTEN REPEATED, ACCUMULATING DOSES

1. Local Effect:
   Local irritation at point of entry, present or absent.
2. Generalized Effect:
   A. *Period of Stimulation:*
      Erythrocytes and leukocytes increased.
      Good health.
   B. *Period of Overstimulation:*
      Erythrocytes and leukocytes still high.
      Loss of weight.
      Bone pains.
      Nerve pains, probably neuritis.
   C. *Period of Exhaustion:*
      Body defense lowered.
      May develop one of three clinical conditions:
      1. *Rapid Progressive Leukopenic Anemia of Pernicious Type:*
         With terminal infection.
      2. *Chronic Leukopenic Anemia of Pernicious Type with Local Infection:*
         Bone necrosis due to irritated tissues at point of entry and effect of radiation on bacterial flora.
         Death from sepsis or intercurrent terminal infections.
      3. *Chronic Leukopenic Anemia of Pernicious Type:*
         Death from anemia or terminal infections.

CONCLUSIONS

1. The cases described in this paper represent practically a hitherto unrecognized form of occupational poisoning. The anemias encountered are for the first time actually proved to be due to the ingestion of radioactive elements with deposition of insoluble, fixed particles in the phagocytic cells of the sinusoids of the reticulo-endothelial system, where they continuously emit irritative rays, which in time produce exhaustion of the adjacent hematopoietic centers.

2. The necrosis of the jaw, which forms an important lesion in this disease, is due to local irritative radiation at the portal of entry, produced by clinging particles of radioactive substances on the gums, teeth and roof of the mouth, activated by increased bacterial virulence of the organisms in the mouth caused by the irritative or stimulative effects of small amounts of radiation. The increased virulence of bacteria when exposed to small doses of radioactivity is in

itself a subject requiring further investigation. Occasionally the buccal lesions and maxillary necrosis have occurred late in the course of the anemia, but usually they precede the anemia or are early symptoms.

3. We believe this is the first time that radioactivity has been demonstrated in the human body during life by means of electrometers. In the organs after death Reitter, Martland and Barker, in an independent observation, demonstrated the presence of radium, mesothorium and their decayed products, especially in the lungs of a chemist and physicist who had died of an acute leukopenic anemia of the pernicious type, due to the inhalation of radioactive dust and emanation. The quantitative results of this case are about to be published. These two investigations probably represent the first readings of the kind that have been made on human viscera. We have made check tests for alpha radiation with normal tissues prepared the same way as the tissues in these cases, and have found no radioactivity in specimens from spleen, liver, bone, lungs, heart, kidneys, brain, and numerous samples of biliary and renal calculi. It is of particular interest that the examination of both metabolic cholesterin and infectious gallstones was negative for radioactivity, because Lazarus-Barlow of St. Bartholomew's Hospital stated several years ago that he had found certain biliary calculi radioactive, and advanced the theory that cancer of the gallbladder might be at times due to this condition.

4. The electroscope or electrometer, as far as we know, has not hitherto been employed for the demonstration of radioactivity in the expired air. It is of very great clinical importance, since active deposits of radioactive elements can be shown in the human body months and years before clinical symptoms appear. We have made numerous check tests on normal individuals and have never found any radioactivity. In a physicist who has handled large amounts of radium or mesothorium, and who four years ago had a severe anemia with loss of several teeth but is now in very good health, we have been able to demonstrate, even four years after contact with mesothorium, a large amount of emanation in the expired air, coming from mesothorium and radium and their decayed products.

5. After radioactive elements are once deposited in the body, there is no known way of eliminating, changing or neutralizing them. They diminish in amount only according to their individual characteristic decay. Radium takes 1,750 years and mesothorium 6.7 years to reach one half of its original activity. We have been trying to influence the infection occurring in these cases by intravenous injections of rapidly oxidizing colloidal solutions, and to influence the deposits by exposure of the body to quartz light. An individual impregnated with such deposits is always in grave danger of dying from a severe anemia, developing years after their original deposition and under conditions in which the real etiology may be obscured or never suspected. We know of five deaths from such deposits in which the cause of death has been variously attributed to sepsis, mouth sepsis, anemia, necrosis of jaw, syphilis and Vincent's angina.

6. There is a voluminous literature on the experimental production in animals of various forms of anemia by the use of radioactive substances. This is a well established fact. The demonstration of radioactivity in such amounts as was found in these cases, taken together with experimental animal work, establishes the cause of the anemia.

7. From our experience, it would appear that the intravenous injections of long lived radioactive elements or the internal administration of radium, mesothorium or radiothorium is highly dangerous on account of the late harmful effects. It is not warranted in any medical condition, as none of the known radioactive substances produce any specific or curative results. The supposed beneficial effects from the early irritative stages might only be countenanced in the treatment of leukemias, Hodgkin's disease, etc., in which the end is expected in a short time. This does not apply to the use of short lived emanation. The value of radium waters is questionable, since most of them at the time they are taken contain little or no radioactivity. Should the waters contain radium or mesothorium in solution, their use would be distinctly dangerous on account of late cumulative effects.

8. An important etiologic factor has been established in the causation of obscure diseases of the blood. We now know that a pernicious type of anemia may be caused by minute amounts of radioactive substances being stored in and adjacent to the blood-forming centers.

9. In view of our experience it would seem advisable to test expiratory air for the presence of radioactivity in all workers in radioactive substances who develop anemia, buccal lesions and similar conditions.

10. In the etiology of obscure blood diseases, it might be easy to conceive of various bacterial and cellular toxins in minute amounts, ultramicroscopic organisms or bacteriophages, producing similar general or selective action on the hematopoietolytic systems. For example, the pathologic stimuli, whatever they are, responsible for Hodgkin's disease, may be very minute in amount and have very selective action, producing increased activity of lymphoblastic centers (hematopoietic system) and increased activity of the cells of the reticulo-endothelial system in the lymph, spleen and bone sinusoids (hemolytic system), resulting in almost a neoplasia, characterized by lymphoid hyperplasia, peculiar multinucleated and giant cells originating from local histocytes of the reticulo-endothelial system, fibrosis, necrosis and eosinophilic infiltration.

Protecting Community Against Fraudulent Practice.—The only satisfactory method of protecting the community from fraud in connection with disease is to insure that every individual who treats disease shall be licensed only after having passed a thorough, satisfactory educational career. Some people have advocated that the medical profession should undertake a scheme of propaganda by film, lecture and otherwise for the education of the public and their protection from unqualified medical practitioners. This might be very desirable, but it does not appear to me that it ought to be carried out necessarily by some organization or other of the medical profession, since this profession would lay itself open to the criticism that it is a trust which is trying to protect itself. It should be done, if considered advisable, either by the General Medical Council in a manner similar to that carried out for the education of the community in dentistry by the Dental Board, or by the Ministry of Health. Perhaps the latter body is the more correct one for this purpose since the General Medical Council is primarily concerned with education; and unless provision is made for the purpose does not possess the necessary funds. Waring, H. J.: Osteopathy, Chiropractic and Medicine, *Brit. M. J.* **2**:682 (Oct. 17) 1925.

VARIATIONS OF THE INTESTINAL RATE *

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The development and the maintenance of the normal tissues are largely due to the assimilation of nutrient substances absorbed from the alimentary canal. The absorption, however, is dependent not so much on the amount of aliment passing along the canal and through the body as on the digested products that pass through the wall of the canal and into the body. Although the extreme complexity of the anabolic processes is far beyond comprehension at present, it is possible to know something about digestion and absorption from the course of the aliment through the canal, and its final molding in the form of the feces.

THE ANABOLIC PROCESSES AND THE INTEGRITY OF THE BODY

The alimentary canal is a highly specialized organ, purposely designed for mixing, reducing and absorbing its contents. The disorders of this organ cannot often be due to imperfections in its mechanism, but are the result rather of the quantity or the quality of the aliment; because in a critical aspect of its action based on the physiology of nutrition, the time of eating, the amount consumed, the completeness, the proportion and the preparation of the food have to be adjusted to elicit the complete cycle of digestion and absorption. But such a complex organ undoubtedly has a protective mechanism—rush peristalsis—by which incomplete and faulty food is rapidly carried through some portions of the intestine, with a failure of absorption. Experimental animals on an incomplete diet often illustrate this action by a diarrhea, after which some form of deficiency disease is produced. These changes, however, are so pronounced that signs and symptoms are observed, and cause and effect are readily recognized.

On the other hand, great variations occur in the time taken for the aliment to pass through the human bowel, or the intestinal rate, without well recognized symptoms; and yet these variations express changes in the amount and kind of absorption and must little by little affect the anabolic processes and the sustenance of the tissues. Perhaps the insidious change shown by the intestinal rate and the form of the feces is the first sentinel to give a warning of a bodily disorder; but if the warning is not observed and corrected, malabsorption continues, the factors of safety in the tissues become exhausted, symptoms are produced, and then some readily recognized disorder is apparent. It seems evident, therefore, when the significance of variations of the intestinal rate are better known and complete and proper nourishment better controlled, that much more may be done to restore and maintain the integrity of the body.

METHODS TO DETERMINE INTESTINAL ABSORPTION

As the anabolic processes appear to be influenced by the course of the aliment, and this in turn is affected by many food factors, a few of these relations have been observed by Gross [1] in experimental animals, and are instructive to consider. He put charcoal into the food of rats and found that the dung of those on a complete diet began to darken in nine hours and continued discolored for 120 hours. Then he tried some of the deficient diets in a similar way. From the animals without vitamin A, the charcoal first appeared in six and was last seen in forty-eight hours; but those without vitamin B lost their appetite and ate very little food, and in small and infrequent dejections sixteen hours elapsed before the dung was discolored, and it continued to be darkened for 384 hours. When the deficiently fed animals were again put on a complete diet and tested, the charcoal took a little longer to appear and disappear. The animals without vitamin A showed a rapid intestinal rate and malabsorption; this was undoubtedly due to the incomplete food. But those without vitamin B showed a very slow rate, which was due to the loss of appetite and insufficient food. Such a rate illustrates the relation between supply and demand, but in this case the relations are extreme. Variations of the intestinal rate in animals have also been observed by Cugnini.[2] He put powdered Brazil nuts into the food of horses, and in thirty-three tests the first appearance of the marker varied between fifteen and twenty hours and was last seen in from seventy-four to 195 hours.

TABLE 1.—*A Normal and a Rapid Intestinal Rate After Seed Ingestion*

RAPID RATE		
Sunday	7:00 p. m.	Took seeds
Monday	8:50 a. m.	Soft; first seeds; initial rate, 14 hours
Tuesday	8:20 a. m.	Soft; seeds
	3:00 p. m.	Soft; seeds
Wednesday	8:00 a. m.	Soft; seeds
Thursday	8:15 a. m.	Soft; last seeds; final rate, 85 hours
Friday	8:30 a. m.	Soft
NORMAL RATE		
Sunday	8:00 p. m.	Took seeds
	10:00 p. m.	Units
Monday	9:00 a. m.	Units
	3:00 p. m.	Units
Tuesday	11:15 a. m.	Units
Wednesday	10:00 a. m.	Units; first seeds; initial rate, 62 hours
	3:00 p. m.	Units; seeds
Thursday	10:00 a. m.	Units; seeds
	3:00 p. m.	Units; seeds
Friday	11:00 a. m.	Units; seeds
	12:00 p. m.	Units; seeds
Saturday	10:00 a. m.	Units; last seeds; final rate 134 hours
	10:30 p. m.	Units

The time taken for substances to pass through the human intestine is generally supposed to be from twenty-four to forty-eight hours. But in adjusting the diet of many patients to conform with the physiology of nutrition as determined by the unit form of the feces, I [3] found that a marker not only generally took sixty-two hours to appear but also continued to be dejected for 134 hours. Recently Alvarez and Freedlander,[4] in a somewhat similar study with colored beads, found when 85 per cent. were dejected in twenty-four hours that the feces were soft and undigested; but, when 70 per cent. of the beads were retained for a week or longer, that no symptoms of disease were found. Furthermore, when strings with different knots

* From the Skin Clinic of the Massachusetts General Hospital.
* Read before the Section on Pathology and Physiology at the Seventy-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., May, 1925.

1. Gross, L.: The Effect of Vitamin Deficient Diets on Rats, with Special References to the Motor Functions of the Intestinal Tract in Vivo and in Vitro. J. Path. & Bacteriol. **27**: 27 (Jan.) 1924.

2. Cugnini: Esperienze sulla durata digestione nei cavalli, Clinica Veterinaria, Sezione practica Settimanale **31**: 436-440, 1908.

3. Burnett, F. L.: The Intestinal Rate and the Form of the Feces, Am. J. Roentgenol. **10**: 559 (Aug.) 1923.

4. Alvarez, W. C., and Freedlander, B. L.: The Rate of Progress of Food Residues Through the Bowel, J. A. M. A. **83**: 576 (Aug. 23) 1924.

were ingested at the meals, Woods and Merrill [5] found the appearance to vary from ten to fifty-seven hours. Then the supper string was frequently seen before the breakfast string, and in a few instances there was a reversal of the order of the strings taken on different days.

Although various markers have already been described to determine the intestinal rate, the action of the human alimentary canal is commonly studied with the roentgen ray after a barium meal. If the rate is to be determined in this way, 4 ounces (125 gm.) of barium may be taken at 8 o'clock breakfast, and then, without further interference with the patient's mode of living, exposures are conveniently made in five, ten, twenty-five, fifty and seventy-five hours. Such a method, however, is somewhat elaborate when numerous tests are required, and the barium may cause an acceleration of rate.[4] The seed test by which all the estimates in this study were made is simple and satisfactory. By this method 50 c.c. of French millet seeds are washed down with water immediately after an evening meal, and then the number of hours noted until five or more are first and last seen easily in the naturally dejected feces. From the time the seeds were ingested until they first appear is called the initial rate, and until they are last seen, the final rate.[3] A rapid rate of from fourteen to eighty-five hours, and a presumably normal rate of from sixty-two to 134 hours are shown in Table 1.

TABLE 2.—*Rapid Rate Reduced to Slow Rate by Dietary Treatment*

Patient M		Patient N	
Date	Rate	Date	Rate
Dec. 14	15-87	Oct. 14	15-75
Dec. 27	24-108	Nov. 1	27-87
Jan. 2	48-108	Nov. 30	21-92
April 10	58-118	Jan. 3	63-123

TABLE 3.—*Relation Between Health and Normal Intestinal Rate in a Middle Aged Man*

1923		1924	
Date	Rate	Date	Rate
Jan. 2	87-159	Jan. 1	88-160
Feb 5	88-162	Jan. 27	67-182
March 18	62-182	Feb. 1	110-155
April 15	50-61	March 2	39-134
May 21	88-158	March 31	63-146
June 12	62-158	April 21	43-164
July 8	74-182	May 6	74-158
July 22	62-159	July 27	86-134
Sept. 2	86-134	Sept 22	87-183
Oct. 7	77-158	Oct. 15	86-162
Nov. 4	86-184	Nov. 9	63-209
Dec. 4	74-134	Dec. 1	87-183

As the seeds represent the course, distribution and discharge of the contents of a single meal, they demonstrate a striking difference in digestion, mixing and absorption in the two tests.

RECORDS OF THE INTESTINAL RATE

Although the records of the intestinal rate shown in Table 1 show a great difference, the rapid rate has been changed to a slow rate in many patients by dietary treatment, as illustrated by the records in Table 2. But to make this change the aliment must be reduced in quantity and improved in quality. Then if this kind of absorption and the anabolic process associated with it are generally continued, the condition of the body will become improved, as the skin of many patients with psoriasis has shown.[6] And finally, if the absorption is generally kept at the presumably normal rate of about sixty-two to 134, the integrity of the body is generally maintained. This assumption is borne out by the records shown in Table 3. These records represent the intestinal rates of a middle-aged man, who, except for a few colds of short duration in the winter, has been quite free of bodily disorders. Furthermore, in a comprehensive health examination made recently, a few of the important results obtained were: normal heart, lungs and kidneys; a blood pressure of 110 systolic, and 80 diastolic; hemoglobin, 102 per cent. (Haldane's scale); nonprotein nitrogen, 36 mg.; and sugar, 90 mg. per hundred cubic centimeters of blood. In a test of physical efficiency, 2 miles was covered on foot in twenty minutes.

TABLE 4.—*Intestinal Rate in Tuberculous Patient During Dietary Therapy*

1921		1923	
Date	Rate	Date	Rate
April 25	15-64	Jan. 18	62-122
May 10	50-114	Feb. 19	62-122
May 19	67-138	March 12	61-121
July 7	64-88	April 2	51-98
Aug. 18	63-111	May 14	62-122
		June 11	74-123
1922		Aug. 16	74-147
Feb. 4	48-72		
July 29	38-50	1924	
Aug. 1	63-134	Jan. 7	50-110
Aug. 14	74-110	March 10	51-133
Sept 4	62-98	April 19	74-123
Oct. 25	44-92	July 13	61-110
Dec. 12	73-146	Sept. 22	85-122

When a patient has a serious disturbance and is not getting the absorption that should be obtained from the food, he is educated to eliminate the faulty food factors in order to improve nutrition. In Table 4 the intestinal rates of a young man during this form of therapy are shown. In April, 1921, he had extensive tuberculous ulcers of the face and the mucous membrane of the nose. At this time he was eating a large amount of food very rapidly, and had an intestinal rate of from fifteen to sixty-four hours. After he learned how to eat according to the absorption, intestinal indigestion was relieved, two dejections entirely composed of units became customary each day, and the intestinal rate changed to about sixty-two to 134. This kind of absorption has generally continued for three years and, with the anabolic processes associated with it and a small amount of external treatment, has very slowly

TABLE 5.—*Intestinal Rate Under Dietary Therapy of Man with Psoriasis*

1922		1923	
Date	Rate	Date	Rate
April 8	27-118	Jan. 7	62-111
April 18	50-123	Jan. 22	37-85
May 8	27-86	Feb. 11	37-125
June 15	36-60	Feb. 18	80-125
June 22	36-133	March 4	38-101
June 29	74-136	March 25	63-149
July 31	15-100	April 1	55-124
Aug. 22	63-124	July 15	15-78
Aug. 18	98-146	Nov. 25	39-63
Oct. 30	87-126	Dec. 2	38-100
Nov. 27	40-112	Dec. 17	15-63
Dec. 25	15-79	Dec. 30	38-86

5. Woods, C. D., and Merrill, L. H.: Studies in the Digestibility of Bread, etc., Bull. 143, U. S. Dept. Agric. of Expt. Stations.

6. Burnett, F. L.: Intestinal Indigestion in Eczema and Psoriasis, Am. J. M. Sc. **166**: 415 (Sept.) 1923.

and gradually brought about a healthier condition of his body. He has gained 25 pounds (11.3 kg.) of flesh and blood, and the ulcerated areas have become almost healed.

The figures shown in Table 5 record the intestinal rate of a young man, who in April, 1922, was covered with lesions of psoriasis. He had been eating too much candy and sweet stuff and had taken cathartics regularly for seven years. Dietary directions to relieve intestinal indigestion were given in the hospital, and the skin improved a little. On returning home, he again took up the sedentary occupation of pharmacist, ate a large dinner in the middle of the day, and took too much carbohydrate food. While he has acquired the habit of generally having two dejections daily, he sometimes has intestinal indigestion with soft and formless feces. At times the skin has become almost healthy; then later a few new lesions will appear. In general, however, the condition has improved.

The intestinal rates of a woman, aged 60, are shown in Table 6. In May, 1923, she had been subject to arthritis for a year. She also complained of constipation and had taken cathartics frequently for thirty, and regularly for ten years. Dietary treatment was begun and cathartics were eliminated, but because she was an elderly woman and unable to exercise, she was given two meals of approximately 50 gm. of protein, 50 gm. of fat and 100 gm. of carbohydrate about as follows: from 10 to 10:30, two eggs, two slices of toast, coffee and an apple; from 6 to 6:30, a lamb chop, potato, string beans, two slices of bread and butter, tea, and rice custard pudding.

TABLE 6.—*Intestinal Rate During Dietary Therapy in Patient with Arthritis*

1923		1924	
Date	Rate	Date	Rate
May 6	12-63	Jan. 25	16-112
June 12	16-64	Feb. 25	40-88
July 14	40-64	March 24	16-64
Aug. 5	49-96	April 23	37-97
Aug. 31	17-65	June 30	37-85
		July 24	37-85
		May 23	37-85

TABLE 7.—*Intestinal Rate During Dietary Therapy of Girl with Psoriasis*

1924		1925	
Date	Rate	Date	Rate
June 17	17-88	Jan. 5	39-156
July 7	39-135		
Aug. 28	15-158		
Oct. 6	38-158		
Nov. 3	60-155		

After a while she began to have a daily dejection. In a few weeks the intestinal rate became a little slower, and the absorption increased. After a few months the pain and swelling of the joints gradually decreased; in six months she got about on crutches and was then put on a light breakfast and luncheon but a good dinner. These meals consisted of about 50 gm. of protein, 75 gm. of fat and 175 gm. of carbohydrate. In a year, without any other form of treatment, she was able to get about without crutches and has gradually walked more and more. Now she does housework and gets about as well as most women of her age.

The figures in Table 7 represent the intestinal rate of a girl, aged 20, who had had psoriasis for ten years. She had eaten irregularly an excess of rich food, and had frequently taken cathartics. Cathartics were eliminated, and she was advised to eat 75 gm. of protein, 75 gm. of fat and 150 gm. of carbohydrate about as follows: from 7:30 to 7:45, one egg, one muffin, one cup of coffee and an orange; from 12:30 to 12:50, lamb stew with vegetables, one slice of bread and butter, and cup custard; from 6 to 6:30, steak, potato, cauliflower, one slice of bread and butter, tea, and tapioca pudding.

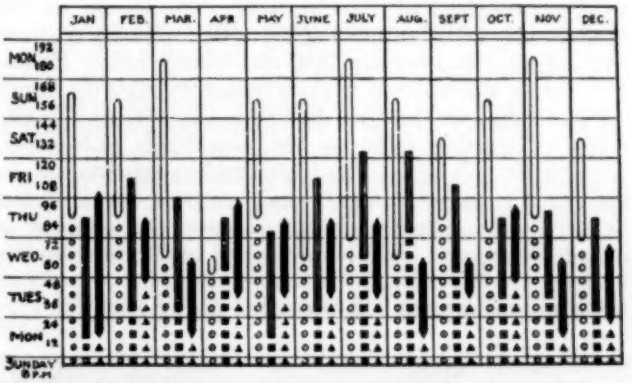

Fig. 1.—A graphic representation of variations in the intestinal rate of three patients during a year. The broken figures show the hours taken by the seeds to go through the bowel—the initial rate, and the solid figures, the discharge of the seed or the final rate. The rounded figures are the rates of Person A, the square, Patient C, and the angular, Patient D.

Within a week the dejections had become regular without cathartics, and the intestinal rate the next week was from seventeen to eighty-eight hours. Since then the intestinal rate has become slower, and the feces have generally been formed in units. At one time she had intestinal indigestion with soft and formless stools and a rapid intestinal rate. The disorder was caused by too much fat food, as bacon, ham, pork, butter and mayonnaise dressing. Then many of the old spots became redder, and a few new spots appeared. A few weeks later, after the elimination of this faulty food factor, she again began to absorb better nourishment, and the lesions have gradually disappeared. She has

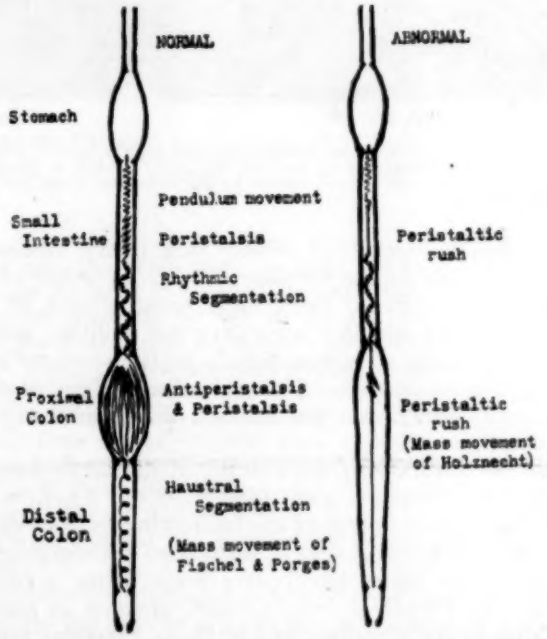

Fig. 2.—Diagram of the intestinal functions at about sixty-two to 134 hours and fifteen to sixty-two hours.

been advised to make a determination of the intestinal rate once a month, and to make a record of the food, the time spent at meals, the time and kind of dejections, and a determination of the intestinal rate every few months and report, in order to keep a check on the integrity of her body and to prevent another attack.

THE PHYSIOLOGY OF NUTRITION AND ANABOLIC PROCESSES

The variations of the intestinal rate shown in the tables and graphically in Figure 1 undoubtedly express the delicacy, complexity and diversified action of the intestine in the passage of the aliment through the body. In the complete cycle of digestion absorption, the aliment is worked over by the pendulum movement, coordinated peristalsis, and rhythmic segmentation in the small intestine. About nine hours is required for these actions. In the large intestine the aliment is kneaded back and forth by peristalsis and antiperistalsis in the proximal colon, formed into segments or units in the intermediate, and finally acted on by haustral segmentation in the distal colon. But if the aliment is devoid of one of the accessory or contains one of the faulty food factors, the critical requirements of this automatic and complex organ are not fulfilled, and an abnormal form of action—rush peristalsis—carries it through some portions of the intestine. Many of these intestinal functions are shown diagramatically in Figure 2.

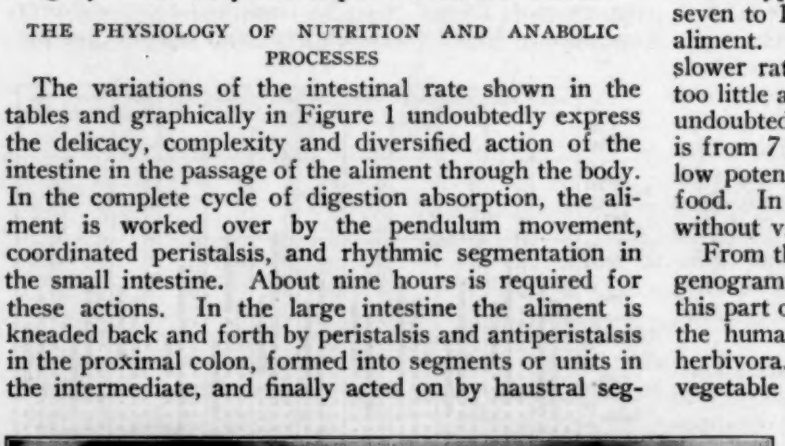

Figure 3. Figure 4.

Figs. 3 and 4.—The colon twenty-five hours after a barium meal. On the left, most of the salt has passed through the intestine, and the colon is comparatively useless; but on the right, the colon appears normal by the formation of the proximal, and fecal units in the distal colon.

As the duration of the aliment in the large intestine is the most variable, some phases of the sensitive and intricate colonic functions are interesting to observe and explain. Figures 3 and 4 show two roentgenograms of the colon taken twenty-five hours after a barium meal. In Figure 3 only a small amount of barium remains in the intestine, and with an intestinal rate of about fourteen to sixty-three hours, the colon is a comparatively useless organ. In Figure 4, however, the proximal colon is well filled, there is a break in one portion of the opaque masses, indicating a closure of the constricting rings of the intermediate colon, and discrete masses or fecal units are apparent in the distal colon. The intestinal rate of a colon with this action is about sixty-three to 134 hours and appears normal.

On the other hand, Figures 5 and 6 show the outlines of a colon fifty hours after a barium meal. In Figure 5 most of the barium has passed out of the proximal, but a great deal remains in the distal colon, and in the lower portion units are apparent. A colon of this type may have an intestinal rate of about eighty-seven to 110 hours, and seems to contain an excess of aliment. But in Figure 6, which suggests an even slower rate of about 110 to 209, there is undoubtedly too little aliment in the intestines. This type of patient undoubtedly has a very deficient condition of the body, is from 7 to 10 kg. underweight, has digestive fluids of low potency, and can consume only a small amount of food. In many respects this patient resembles the rats without vitamin B previously referred to.

From the contents of the colon shown in these roentgenograms it is evident that digestion and absorption in this part of the intestine is very variable. Anatomically, the human colon is sacculated with haustra like the herbivora. In these animals, however, the reduction of vegetable substances into flesh and blood requires not only the action of a very complex alimentary canal, but also the action of a blind pouch—the cecum—which "must exercise some important influence on the digestive process."[7] Digestion in the cecum takes a long time; for in the short intestine of a rabbit Alvarez and Freedlander[4] found 26 per cent. of beads ingested in seventy-two hours, 28 per cent. after fifty-two hours, and 14 per cent. given twenty-seven hours previously. As man is omnivorous and needs the prolonged digestion of vegetable substances, some portion of the intestine must fulfil this requirement, and this is undoubtedly the function of the proximal colon. Moreover, in the best known metabolic disorder, diabetes mellitus, there must have been a failure of this essential form of carbohydrate digestion over a long period, as the efficacy of treatment depends largely on very reduced diet. Such a procedure suggests that the benefit is largely derived from improved action of the colon and associated anabolic processes.

In adjusting the diet to the requirements of the body according to the physiology of nutrition, it would seem as if the alimentary canal of adults was intended to receive but two meals—one in the middle of the morning and another in the evening. Such an assumption is explained in this way. If an evening meal were finished at 7 o'clock, it would have completely passed into the colon by 4 the next morning. But during the night the body is at rest, and the tissues must have become seeped with sustenance. Without more food immediately after awakening, all the available nutrient material is in the colon. The activity of the body during the day creates a demand for nourishment; and it is this demand that brings about a closure of the physiologic constriction rings and the waves of antiperistalsis of the proximal colon. The ancient Greeks and the people of Hunza described by McCarrison[8] ate only twice during the day and were known to have been unusually healthy. Moreover, the therapeutic advantage of this regimen has been tried with a few

7. Flower, W. H.: Comparative Anatomy of Organs of Digestion of the Mammalia, M. Times & Gaz. 44: 216, 1872.
8. McCarrison, Robert: Studies in Deficiency Disease, London, Henry Frowde, 1921, p. 9.

elderly and sedentary patients, as shown in Table 6, and found to be very advantageous. The same action, however, seems to be brought about in most persons if the first meal is divided into a small breakfast and luncheon.

CONCLUSION

The development and maintenance of the normal tissues is largely dependent on the assimilation of nutrient substances absorbed from the alimentary canal, and while the anabolic processes are very complex and far beyond comprehension at present, a great deal can be learned about absorption from the course of the aliment through the intestines and its final molding in the feces. The variations that occur in the intestinal rate and the feces are so insidious that symptoms are not often produced; and yet little by little they must influence the anabolic processes and the sustenance of the tissues. Perhaps these variations are the first sentinel to give a warning of a bodily disorder; but if the warning is not observed and corrected, malabsorption continues, the factors of safety in the tissues become exhausted, symptoms are produced, and then some readily recognized disorder is apparent.

Digestion and absorption in the most highly developed organism is an exact process, and many factors have to be taken into account in adjusting the diet to the critical requirements of the body for nourishment. In general, however, when the amount of aliment is reduced and the quality improved in patients with psoriasis, the feces become formed in units, and the intestinal rate changes from a rapid one of from fourteen to sixty-two hours and malabsorption, to one of from sixty-three to 134 hours. When this kind of absorption and the anabolic processes associated with it continue for some time, the skin becomes healthy but remains so only as long as it receives this kind of nutrition.

In this form of dietary treatment the adjustment of the alimentary mixture is merely made to conform to the precise, automatic and apparently normal action of the colon in the physiology of nutrition. By this action the proximal colon is formed by the closure of constricting rings in the intermediate colon. The formation of this digestive pouch appears to be brought about when the demand for nourishment is greater than the supply, and this also excites waves of antiperistalsis. However this may be, prolonged digestion of vegetable substances appears to be essential for the anabolic processes and the normal sustenance of the tissues. It seems evident, therefore, when the significance of variations of the intestinal rate are better known, and complete and proper nourishment better controlled, that much more may be done to restore and maintain the integrity of the body in the complex and sensitive equilibrium of health.

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ABSTRACT OF DISCUSSION

DR. A. J. CARLSON, Chicago: Unless there is delay in gastric and intestinal digestion, about 90 per cent., or more, of the food has already been digested and absorbed by the time the material enters the large bowel, so that from this aspect adequate nutrition is not a question of too brief delay in the colon, but of adequate digestion in the intestine above. Most of us eat enough so that if we secure 90 per cent. out of the food we consume we have sufficient. The essential function of the large bowel seems to be absorption of water (concentration of the material) rather than the absorption of nutrient material. I cannot see any possible advantage of delay in the large bowel over and above that which is required for the concentration of the material. As to the methods of studying the intestinal rate, we must apparently take into account the physical character and specific gravity of the material we add to the foods, as shown recently by Mr. Hoelzel in experiments on himself. If we give material of greater specific gravity than the food, we secure the rate for this material but not the rate for foods. Even seeds may lead to mistakes in interpretation, not as regards the initial appearances in the feces, but the last appearance. Seeds somehow stick to or in the alimentary canal all along the line, and some seeds may remain in an apparently normal person apparently as long as fifteen days. Now, it is absurd to think that that represents the actual time in the intestine of any considerable part of the food. What we have to look for in studies of this kind is the time that the essential mass of the food residue gets through.

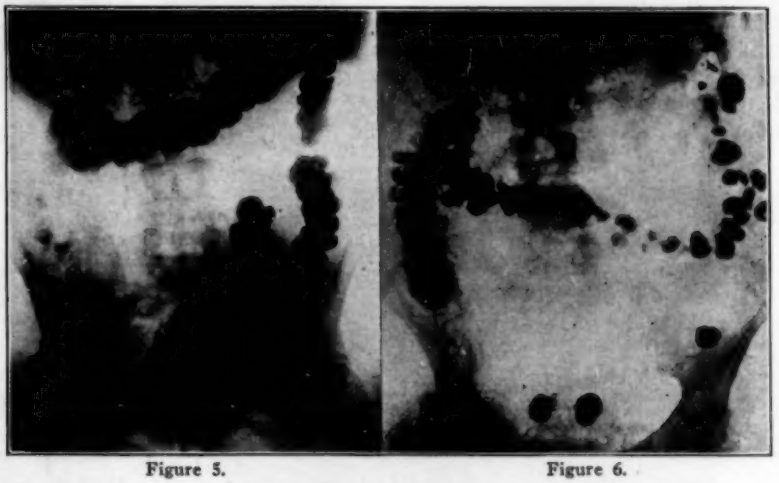

Figure 5. Figure 6.

Figs. 5 and 6.—The colon fifty hours after a barium meal. On the left, the distal colon appears to contain an excess of nutrient material; but on the right, there is too little aliment in the intestine, and an abnormal delay in its passage. (Figure 6 was taken by Dr. James T. Case.)

DR. FRANCIS LOWELL BURNETT, Boston: In regard to the 90 per cent. absorption from the small and 10 per cent. from the large intestine, it seems to me that these estimates may not be very accurate. At best, the amount of absorption from one or the other part of the intestine must be difficult to determine. Then, in view of some of the results I have been getting by adjustments in diet to elicit the apparently normal action of the colon as shown by the form of feces, I rather question these figures. Another point in regard to the absorption of fluid as the chief function of the colon: It would seem as if dehydrated children might be greatly benefited if they were fed so that the apparently normal action of the colon were obtained and a great deal more fluid taken into the body.

Sanitary Supervision of International Traffic.—As a means of preventing the introduction of diseases over maritime and land borders, the federal government participates in the international sanitary agreements now in force in the Eastern and Western hemispheres. Officers of the Public Health Service serve as representatives of the federal government at international conferences for the revision of these agreements; also as representatives of the International Office of Public Hygiene at Paris and the International Sanitary Bureau of the American Republics at Washington.—Kerr, J. W.: *Pub. Health Rep.* **40**:1680 (Aug. 14) 1925.

ATTENUATED BONE INFECTIONS

CONSIDERATIONS IN THE TREATMENT OF OSTEOMYELITIS *

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The persistence in the body of pathogenic bacteria to which their host has grown immune is instanced by diphtheria bacilli in the throat and typhoid bacilli in the gallbladder of carriers. That the urethral crypts may harbor gonococci for many years is well known. In the solid tissues, as well as in the cavities and spaces of the body, bacteria may linger indefinitely without symptoms. I have seen *Bacillus pyocyaneus,* a secondary invader, apparently disappear from a wound that continued to heal, only to reappear when the same tissues were opened again several months later.[1] I have also recorded a case of actinomycosis of the groin that appeared four times in twenty years, with six and seven year intervals of complete and apparently definitive healing.[1] The chronic bone abscess is an exquisite example of this longevity of organisms in the tissues, of the attenuation of bacterial virulence and of the long latency of low grades of bone infection. The longevity and latency of typhoid bone invasion are well known. *Staphylococcus aureus,* the common invader of bone, and streptococci may lie dormant in the osseous tissue for many years after the storm of the acute osteomyelitis has passed and then, reactivated, may produce a more or less violent recrudescence of the disease or, more commonly, may reveal their presence by some milder process of suppuration or necrosis.

Fig. 1 (Case 1).—Periarticular abscess of right hip, pointing in outer aspect of thigh, two years after acute osteomyelitis of left femur: "silent" inflammatory changes in acetabulum.

These phenomena of latent, attenuated infection are to be observed not merely in the same bone but also in one or in several distant bones. The involvement of two or more bones in rapid succession in acute osteomyelitis is not at all uncommon. Metastatic bone infections of the attenuated type, however, are more often latent, evidencing their presence after intervals of many months. This type of disseminated, avirulent bone infection, Phemister [2] of Chicago described under the apt title of "Silent Foci of Localized Osteomyelitis." He emphasized that localized osteomyelitis may begin "silently" and proceed to the stage of complete destruction of the bony area involved, with surrounding new bone formation, before there are any local symptoms whatever. This condition, he says, is apt to be found in patients in whom some focus of bone infection has remained active. It seems to me a question, sometimes, whether such a distant process is a late metastasis at about the time symptoms develop, from a focus not yet extinct, or whether it is a dormant or "silent" metastasis that took place long before; viz., at the time of the acute hematogenous invasion. There are reasons, bacteriologic and roentgenologic, for believing that the latter is the usual process. What I wish to stress is that these metastatic or "silent" foci represent attenuations of the original infection and that they present opportunities for conservative operative procedures—drill drainage of chronic bone abscesses, simple sequestrectomy, simple drainage of subperiosteal abscesses, etc.—a surgical attitude that Walton Martin [3] of New York has also adopted.

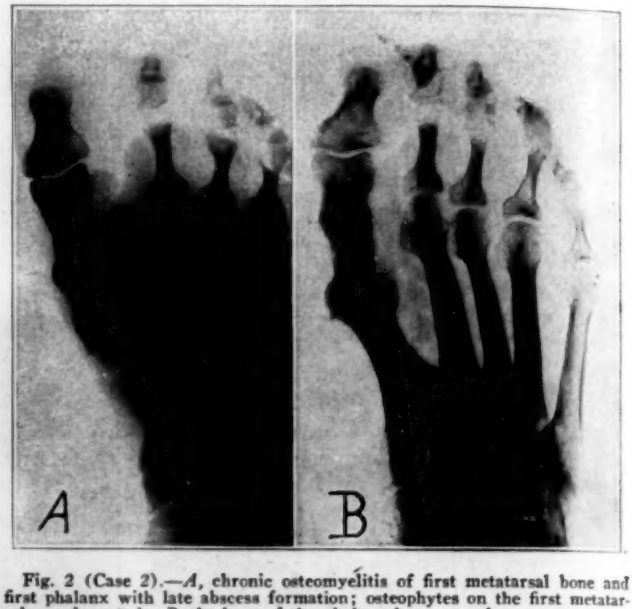

Fig. 2 (Case 2).—*A*, chronic osteomyelitis of first metatarsal bone and first phalanx with late abscess formation; osteophytes on the first metatarsal may be noted. *B*, the base of the phalanx has escaped as a sequestrum, and the drainage wound has promptly closed.

CASE 1.—P. B., a boy, aged 15 years, was referred to me in October, 1923. A year before he had had acute osteomyelitis of the left femur and abscesses of the right forearm and left axilla; all had been operated on. He was anemic, looked ill and had a temperature of 101. There was bony ankylosis of the left hip and fibrous ankylosis of the left knee. The

* Read before the Section on Orthopedic Surgery at the Seventy-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., May, 1925.

1. Brickner, W. M.: Pelvic Actinomycosis: A Study of Five Consecutive Cases Successfully Treated by Operation, Ann. Surg. **81**: 343 (Jan.) 1925.

2. Phemister, D. B.: Silent Foci of Latent Osteomyelitis, J. A. M. A. **82**: 1311 (April 26) 1924.

3. Martin, Walton: The Results of Staphylococcus Infection of Bone, S. Clin. N. Am. **3**: 409 (April) 1923.

thigh, much scarred, bore two sinuses in its lower third, discharging pus and leading to the femur; there was a discharging sinus above the trochanter. At operation, at the Broad Street Hospital, I injected these tracts with methylene blue solution and laid them open. Freely dividing the muscles of the gluteofemoral region, I found that the upper tract led toward the ilium, then down to a large cavity behind the head and neck of the femur, in which lay two small sequestrums.

The sinus on the outer side of the lower thigh led to a large cavity in the lower end of the femur, extending to the articular surface of the knee joint and containing no sequestrum. This cavity was cleaned out of its contained débris and made more shallow by chiseling. The sinus on the inner side of the thigh led to a cavity in the posterior aspect of the femur, containing two sequestrums.

The boy rapidly improved in health after this operation, and the wounds made steady progress to healing. A short sinus, discharging scantily, remained for a long time on the inner aspect of the thigh, leading to solid bone. I felt sure that a small sequestrum would form there and discharge, and this finally happened a year later (November, 1924). Then two small sequestrums escaped from this sinus, and it promptly closed.

Meanwhile—in June, 1924—a tender, painful swelling appeared on the dorsum of the right foot over the base of the fourth metatarsal. Roentgenograms showed in the base of the fourth metatarsal an inflammatory bone thickening bearing a small cavity. There was no fever. The patient was put under nitrous oxid and an incision was made evacuating an abscess that had broken through the periosteum over the fourth metatarsal. No sequestrum was found. A rubber dam drain was inserted, and the wound was otherwise sutured. The drain was removed in three days. The wound was completely healed in three weeks, and there has been no recurrence of any symptom there.

Fig. 3 (Case 3).—Chronic osteomyelitis of femur with recurrence of suppuration after ten years. Exploratory osteotomy negative. Four months later a small sequestrum has formed (below the site of exploration), the removal of which is followed by gradual healing.

In November, 1924, an abscess formed in the left buttock. It led down to the hip, but no bare bone was felt. Healing took place promptly after drainage and the escape of a minute sequestrum. There has been no recurrence in that region thus far.

In March, 1925, an abscess appeared over the outer upper aspect of the *right* thigh. The roentgenogram (Fig. 1) showed no involvement of the bone, but it did show an old inflammatory process in the right hip—a joint lesion that had given no symptoms while the boy was under my observation, but which had been noted roentgenographically when he first came to me. Indeed, Figure 1 and the roentgenogram of the right hip taken in October, 1923, are identical. Incision proved this to be a periarticular abscess pointing in the thigh. The joint was not open, and no bare bone was felt. Suppuration diminished promptly, and the wound closed rapidly and has remained healed.

The products of pyogenic infection of a bone are: suppuration, periostitis, bone destruction and bone production.

New bone production, usually with increased density and thickening, is a reparative, reconstructive process. It requires no treatment, except in efforts to preserve bone length and, sometimes, to correct deformity.

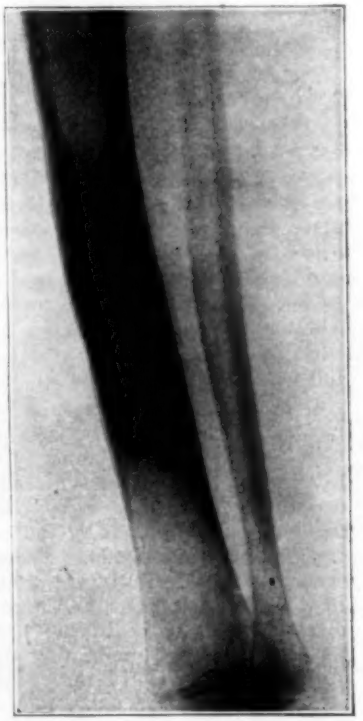

Fig. 4 (Case 4).—Chronic medullary abscess of the tibia, causing pain and soft-part swelling, three years after healing of a compound fracture. The centripetal growth of compact bone invading the medullary cavity may be noted.

Periostitis in itself also rarely demands any surgical attack. It is a part of the inflammatory process, and it subsides with the subsidence of the bone infection.

Bone destruction is the important pathologic process in chronic osteomyelitis—a necrosis that goes on, often over a period of years, to the production of sequestrums of various sizes. This necrosis is associated with, and is the essential cause of, continued suppuration and, often, sinus formation. When these sequestrums are extruded or removed, the sinuses usually close and the suppuration ceases completely, unless some undetached bone is still undergoing necrosis, or until the attenuated infection in the bone initiates a later cycle of necrosis and sequestrum formation. The recognition of this relationship between bone necrosis and suppuration, in *chronic* osteomyelitis, establishes, it seems to me, two important principles in its surgical therapy:

The first of these is that one should wait until a sequestrum has actually formed before operating on the bone. One should provide, if need be, adequate drainage through the soft parts; but if there is no actual sequestrum present, he should delay further procedure until it has developed. In such cases roentgenography at intervals is, of course, very helpful; in most instances the number, size and location of sequestrums are thus revealed. To chisel away more or less necrotic bone before there is a complete sequestration is not a good practice, though a common one; it is an operation in which, in the nature of things, one does too much or too little.

The second principle, also more honored in the breach than in the observance, is to content oneself, for the time being, at any rate, with the removal of the offending sequestrum or sequestrums. Very often, *in spite of overhanging bone*, this may be all that is necessary to effect not only cessation of suppuration but also definitive healing.

CASE 2.—B. A., a woman, aged 20, developed an osteomyelitis of the right first metatarsal bone, from a penetrating wound of the foot in 1923. After repeated operations there was healing of the wounds for a time. In November, 1924, there appeared an abscess pointing dorsally in the web space between the first and second toes. The roentgenogram (Fig. 2*A*) showed no cavity or sequestrum, and none was found at operation, so I merely drained this abscess. A few weeks later the base of the first phalanx necrosed and was lifted out as a large sequestrum. Suppuration ceased promptly and the wound healed, an ankylosis of metatarsal and phalanx developing (Fig. 2*B*). There has been no recurrence of suppuration.

CASE 3.—Mrs. R. B. developed osteomyelitis of the right femur in 1910, and was operated on then, and, by me, again in 1914. There was considerable scarring and deformity, and ankylosis of the knee, but no fresh suppuration until August, 1924. Then pain, swelling and redness developed over the lower third of the thigh anteriorly, with slight fever. I drained a large pus pocket, and performed an exploratory osteotomy, but I found no focus in the femur. Suppuration and sinuses persisted until December, 1924, when roentgenograms (Fig. 3) showed the presence of a small sequestrum. This, lying postero-internally, and below the site of the exploratory osteotomy, I removed by an operation. There followed gradual cessation of suppuration and healing.

CASE 4.—W. W., a boy, aged 14, suffered a compound fracture of the right tibia in 1920, and sequestrums were removed three months later, followed by healing with thickening and lengthening of the bone. In October, 1923, he was referred to me because of pain, redness and swelling over an area at the junction of the middle and lower third of the leg. His temperature was normal. There was pronounced localized bone tenderness. Roentgenograms showed that the swelling was in the soft parts and that the medullary cavity was encroached on by centripetal bone growth (Fig. 4) at the level of tenderness, indicating that the chronic abscess was medullary. Under nitrous oxid anesthesia, I made an incision down to the periosteum and drove a three-sixteenth inch drill through the periosteum and into the medullary cavity at the level of maximum tenderness. A small amount

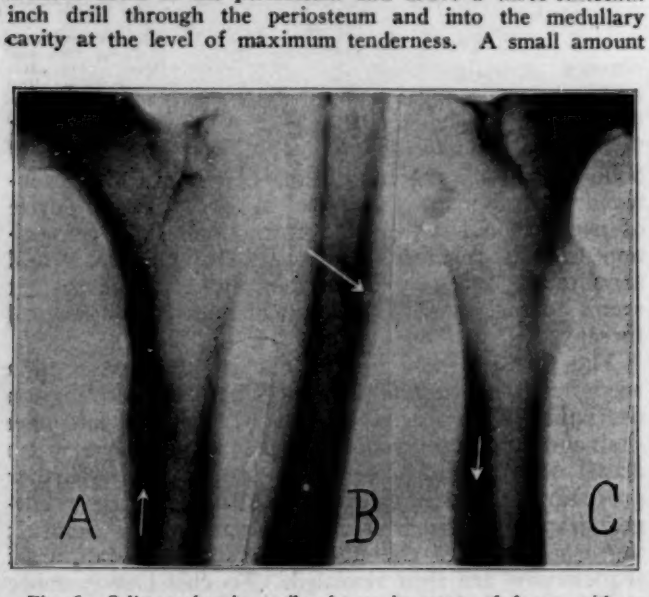

Fig. 5.—Solitary chronic sterile abscess in cortex of femur, with no discovered antecedent infection, in three cases, promptly cured by operation. *A*, abscess in postero-internal aspect of femur below lesser trochanter; pain developed a few weeks after a fall on the thigh, and continued for many months, disappearing at once after osteotomy.

of thick, yellow pus escaped. Drill holes above and below evacuated no pus; I had drained the entire abscess. The pus showed in smear a few gram-positive cocci and in culture a nonhemolytic streptococcus. The pain ceased promptly. The three openings remained for an unusually long time as almost dry sinuses, but eventually closed, minute circular sequestrums escaping from two of them.

Three months after this operation there developed a subcutaneous abscess in the upper part of the leg. This was merely incised, for roentgen-ray examination showed no loose bone. A small sequestrum formed and escaped a little later, and the small wound then promptly closed.

A few months later a sinus appeared in the midleg and a subcutaneous abscess on the outer side of the leg. These

Fig. 6.—Chronic sterile area of bone softening and granulations, surrounded by dense bone, in the intertrochanteric line, giving pain two years after a trauma (fracture of the margin of the acetabulum).

required incision and exploration. The sinus led down between tibia and fibula, but no bare bone was found. The larger abscess was also wholly in soft parts. Free drainage was established, but the bone was not touched; and I was rewarded in my judgment against any osteotomy by the gradual and definitive closure of these wounds also. The leg has thus far remained healed and free from pain.

I quite appreciate, and I too have often yielded to, the temptation to perform an extensive osteotomy in these cases of chronic osteomyelitis with sinuses, suppuration and one or more sequestrums. One hopes by chiseling and scraping away to a solid column of so-called healthy bone to eradicate the disease process at once and to effect a prompt and permanent wound closure. How often such hopes are disappointed! Every chisel stroke, every scrape of the curet is an invitation to fresh sequestrum formation; and the extensive osteotomy often serves to delay rather than to hasten the cure.

I quite appreciate, too, the importance of the shallow bone trough to afford an opportunity for contacting with the overlying soft parts. This is an accepted mechanical principle, which has, however, been made a fetish. Too often, I think, surgeons insist on at once removing, often extensively, ledges of healthy bone in cases of chronic osteomyelitis, when a simple sequestrectomy might serve as a primary operation. I believe it is better to delay the plastic osteotomy until its necessity and its extent are more definitely deter-

mined and until the field is more nearly aseptic. To effect cessation of suppuration, the removal of the dead bone is much more important than the removal of overlying healthy bone. In spite of preconceived notions, it is by no means always necessary to remove bone over the length of a suppurative process (to which I shall advert again), and probably all surgeons have sometimes seen bone cavities heal over, after sequestrectomy, without removal of their sides, and have even occasionally observed the phenomenon of a large bone defect healing by granulations.

Sometimes a bone cavity is so deep and so situated, e. g., in the head of the tibia, that its eradication by osteotomy is not to be considered. In such a case, sterilization of the cavity by Carrel-Dakin treatment and implantation of an autogenous fat graft may effect closure. For an indolent cavity surrounded by a wall of dense bone, I would suggest a trial of multiple drill holes through that thickened wall, made from within the cavity.

Because it has an important bearing on my subject, I do not think I am much digressing from it to emphasize that what I have said concerning undue attack on healthy bone in chronic osteomyelitis applies also, and even more forcibly, in acute osteomyelitis. As an intern I was taught, and for several years I continued, to chisel away the cortex and cancellus over the full extent of the medullary suppuration (often the entire length of the diaphysis) and then vigorously to scrape out the medullary cavity, thus taking away its surrounding cancellous bone. I am sure that the latter step, especially, is a very bad practice. The marrow pus can be adequately removed by far gentler means. The cancellus is important for bone regeneration and should be preserved as far as possible. As T. Wingate Todd[4] of Cleveland has said, "Cancellous tissue must be conservatively dealt with and under no circumstances removed entirely. It is the bone abscesses which are 'thoroughly' curetted out so that only the compact shell remains which result most disastrously from the point of view of healing. Especially is this the case in those instances in which pure carbolic swabbing is used to finish the destructive work of the curette." John Fraser[5] of Edinburgh also protests against the common practice of scraping out the bone in acute osteomyelitis.[6]

I have, indeed, been getting away from free osteotomy in acute osteomyelitis. I believe that one can accomplish his purpose equally by making drill holes of sufficient size and number, through which the medullaris can be drained. That intervening corticalis may necrose is not important; extensive necrosis may also occur after the free osteotomy. In a case of fulminating osteomyelitis of the humerus and staphylococcemia in a little girl, I made a drill hole at the upper and one at the lower end of the diaphysis, and removed the suppurating medulla by means of a strip of gauze passed on a probe from one opening to the other. The child made an excellent recovery. A sequestrum formed at each drill site, and when these were removed definitive healing took place. As compared with osteotomy the full length of the humerus, this child was spared prolonged hospitalization, extensive scarring and, probably, deformity. I confess that—especially when the periosteum has been stripped up by pus—I sometimes yield to the temptation to remove as much of the presenting bone substance as is suppurating. I think, however, that this is not necessary if drainage is provided by multiple trephination; the bone that will not survive will exfoliate spontaneously.

While subperiosteal abscess is fairly common in acute osteomyelitis, a chronic subperiosteal abscess is only occasionally encountered. The variety produced by the typhoid bacillus communicates typically through a cloaca in the bone with an abscess in the osseous substance.

Chronic collections of pus *within* the bone (bone abscesses) have interested me greatly for several years. The discrete abscess in the cancellous tissue has been long known as Brodie's abscess. Until rather recent years it was commonly supposed to be tuberculous and to occur only in the cancellus and in or near the epiphysis ("epiphyseal abscess," Cruveilhier). In fact, however, such a chronic abscess may occur at any level in the length of bone, in the compact as well as in the cancellous substance, and it is very rarely tuberculous.

In 1917, I called attention to chronic abscesses in the medulla of the long bones[7] as a condition but little recognized, for I found exceedingly few references to it in a search of the literature in English, German and French, including the standard works on general and surgical pathology and on surgery. I quoted Sir Anthony Bowlby as saying in his Surgical Pathology, "Chronic abscess is never met in the shafts, but always in the cancellous tissue of the epiphyseal ends," an erroneous statement which he repeated in his 1921 edition.

As contrasted with abscesses elsewhere in the bone, a chronic accumulation of pus in the medullary canal, like acute suppuration therein, often does not show, as such, in the roentgenogram. The appearance is then merely that of the associated osteoperiostitis. There is, however, this suggestion for a diagnosis in the film: there may be very little external thickening of the bone, and the osteitis spreads centripetally, encroaching on and sometimes, in one or more places, obliterating the medullary cavity (Fig. 4). This internal thickening is by dense, dry bone, and such an osteitis or osteoperiostitis (when, by its appearance or otherwise, syphilis can be excluded, and when there is no evident necrosis or cortical abscess) indicates the possibility of a medullary abscess. If the medullary cavity is invaded by osseous growth in such a manner as to surround an "island" of pus, such a central abscess will appear in the film as a dark area, unless, indeed, the surrounding bone is so thick and so dense as to obscure the picture of the cavity within. Abscesses within the cancellous substance of the bone show clearly, of course, in the roentgenogram. The bone surrounding the abscess is usually of greatly increased density, but sometimes the cavity is in bone of normal or nearly normal density.

Chronic bone abscesses, central or cortical, are often, if not usually, residual from an osteomyelitis active even twenty or more years before the abscess makes its presence known. In Figure 5, however, are roentgenograms of three consecutive cases of solitary, chronic, sterile, cortical abscess of the femur in young women, which I operated on within the past year in my service at the

4. Todd, T. W.: The Rôle of Cancellous Tissue in Healing Bone, Ann. Surg. **72**: 452 (Oct.) 1920.

5. Fraser, John: Discussion on Acute Osteomyelitis, Brit. M. J. **2**: 605 (Oct.) 1924.

6. In passing, it is of interest to note that Fraser expresses the opinion that the cases of acute osteomyelitis in children that subside spontaneously are almost invariably instances of pneumococcus infection.

7. Brickner, W. M.: Chronic Medullary Abscess of the Long Bones: Its Clinical and Roentgenographic Features: Its Treatment by Simple Trephining, Ann. Surg. **65**: 483 (April) 1917.

Hospital for Joint Diseases, and in none of which was there any antecedent osteomyelitis or other discovered or remembered infection. In the case illustrated in Figure 5 *A*, the pain began a few weeks after a fall on the outer side of the thigh. Figure 6 is the roentgenogram of the hip of a boy with the roentgen-ray and clinical signs of a pea-sized bone abscess in the intertrochanteric region, of one year's duration, developing two years after a trauma (fracture of the margin of the acetabulum); a small area of softened tissue was found, surrounded by dense bone, but there was no pus. This softened area in the femur showed, microscopically, atrophic bone trabeculae, osteoclasts, granulation tissue and much thickened blood vessels—a circumscribed nonsuppurative osteomyelitis.

It is difficult to decide, sometimes, whether a small chronic abscess is cortical or subperiosteal in origin. Whether only a drop or two of pus in the cortex or several drams in the medullary canal, chronic bone abscesses have a uniform symptomatology: persistent pain (often radiating and mistreated for "neuritis" and "rheumatism") and distinct localized bone tenderness. The condition is usually afebrile but sometimes subfebrile (100, even 101). As I pointed out in the article to which I referred, and in two later publications,[8] chronic bone abscesses tend to become sterile, that is to say, the organisms in the pus (usually staphylococci) are dead or much attenuated. The recognition of this phenomenon led me to devise the treatment of these nonperforating abscesses, large or small, that I have elsewhere described; namely, by simple evacuation through a small drill hole:

> With the patient under nitrous oxid narcosis, an incision about 2 inches long is made through the skin and (except, for example, over the inner surface of the tibia) the underlying muscle is split, or retracted, to expose the periosteum. Through this and into the bone, at a point determined by roentgenogram or by the level of maximum tenderness, a drill from one-eighth inch to one-fourth inch in diameter is driven deeply enough to permit the escape of pus. If, perchance, the situation of a small abscess has not been estimated accurately enough for it to be thus tapped by the first opening, other drill holes can be made with little damage to the bone, or the surgeon may defer the completion of the operation to determine roentgenographically the relative levels of the abscess and his first drill hole. With the escape of pus the drill is removed and nothing else is introduced into the bone—no probe, curet, or gauze packing. A culture is made from the pus to determine what, if any, living organism it contains. A smear is also stained and examined at once. (Often the smear shows a few staphylococci and the culture remains sterile.) A small drain of folded rubber dam is laid in the soft parts down to, but not into, the opening in the bone, and the wound is otherwise closed by sutures. A simple gauze dressing completes the operation. The patient is immediately relieved of his pain. The drain is to provide for any further escape of pus from the bone, and to act as a safety valve in case of possible suppuration in the bone cavity or the soft parts, caused by dormant organisms awakened to activity. It is removed, usually without replacement, in three or four days; i. e., as soon as discharge has practically ceased. The small opening in the soft parts is then allowed to close and, ordinarily, healing of the entire wound is complete in ten days or less, few of which, usually, are spent in bed. Contrast this with the prolonged disability and invalidism, not to speak of the scarring and deformity, of wide-open osteotomy and slow "healing from the bottom," with its inherent risks of sequestrum formation and secondary operations!

Occasionally a small ringlike sequestrum forms at the drill site and final healing is delayed until this escapes. The soft parts are healed before the opening into the bone; and, in turn, the drill hole fills with bone long before the abscess cavity does. Indeed, as I have pointed out, roentgenograms will often show this cavity in the bone persisting months and years, filled, probably, with granulation or fibrous tissue.

Writing a few years later on the treatment of bone cavities, Walton Martin[9] also observed that cavities may fill with fibrous tissue and heal over while the bone defect is seen in roentgenograms to persist. Of Brodie's abscess, he said that if one of the walls of the cavity is cut away so that there is no overhanging roof, the soft parts can be brought together and the skin sutured, as recommended by Watson Cheyne twenty-five years ago or more, for "the micro-organisms have not sufficient virulence to infect the blood clot." Martin believes that this is the most satisfactory method for small, chronic, localized abscesses surrounded by eburnated bone. It is, however, much more of an operation than the equally curative procedure of simply drilling into the abscess under nitrous oxid; and it would be a rather mutilating operation if applied to unroofing an extensive collection of pus in the medulla. Bevan[10] of Chicago and McWilliams[11] of New York each also recorded the treatment of chronic bone abscesses by freely removing overlying bone, applying chemical antiseptics and then closing the soft parts over, Bevan by primary and McWilliams by delayed suture. The abscesses being sterile or nearly so, such osteotomies are unnecessary, as the results of my simpler method have shown. In all my cases, it has thus far proved entirely successful, including those in which the pus was not sterile, in three of which the overlying skin was somewhat red and the patient had had a slight daily rise of temperature. I am prepared to believe, however, that healing may not always thus promptly take place. It is conceivable that, as the result of introducing a secondary infection or of the awakening into activity of dormant organisms, suppuration may continue and require further operation. Even accepting such a possibility, there is much to be gained and little to be lost by a trial of the simple minor operation of merely draining the chronic bone abscess through a small drill hole.

SUMMARY

The phenomenon of attenuation and longevity of pyogenic bacteria in the bones is exquisitely illustrated in the chronic bone abscess, and is to be observed in other latent local and metastatic foci of osteomyelitis. In these conditions, especially, it affords opportunities for conservative surgery—drill drainage of nonperforating chronic bone abscesses, incision of subperiosteal abscesses, simple sequestrectomy.

The important pathologic process in chronic osteomyelitis is bone necrosis. There is a definite causal relationship between this necrosis and suppuration. When necrosed bone escapes or is removed, the suppuration usually ceases.

Two important principles apply in the surgery of chronic osteomyelitis: First, the bone itself should not be attacked until a sequestrum has definitely formed.

8. Brickner, W. M.: Chronic Bone Abscess: Its Treatment by Simple Evacuation Through a Drill Hole, Surg., Gynec. & Obst. **35**: 84 (July) 1922. The Treatment of Chronic Bone Abscesses by Simple Evacuation Through a Small Drill Hole: Its Application in Nonsterile Abscesses, J. Bone & Joint Surg. **5**: 492 (July) 1923.

9. Martin, Walton: The Treatment of Bone Cavities, Ann. Surg. **71**: 47 (Jan.) 1920.

10. Bevan, A. D.: Brodie Abscess, S. Clinics, Chicago **3**: 737 (June) 1919.

11. McWilliams, C. A.: Central Bone Abscess: Brodie's Abscess: Chronic Suppurative Osteomyelitis, Ann. Surg. **74**: 568 (Nov.) 1921.

Second, the simple removal of sequestrums may be all that is necessary to effect healing, in spite of overhanging healthy bone. As a rule, simple sequestrectomy should serve as a primary operation. The shallow bone trough may be required to effect definitive healing, but plastic osteotomy may be wisely deferred until its necessity and extent are definitely indicated.

Osteotomy cannot be applied in all situations to eradicate bone cavities, which, however, sometimes close up or close over spontaneously. For an indolent cavity, surrounded by a wall of dense bone, the drilling of small holes through that wall is suggested.

In acute osteomyelitis, extensive gutter osteotomy is not necessary, and scraping out the cancellous bone is to be severely condemned. Drainage can be provided through drill holes (trephinage) of sufficient size and number, or through bipolar trephinage; and suppurating medullaris may be adequately evacuated with gauze wipes or irrigation, or may be left to drain out.

Chronic bone abscesses may be medullary or cortical, may be at any level of the bone, and are rarely tuberculous. Their symptoms are pain and bone tenderness, occasionally slight fever. Chronic bone abscesses are usually residual from, and give symptoms years after, acute osteomyelitis. There is illustrated, however, a series of solitary, chronic, sterile, cortical abscesses without any discovered antecedent infection. Nonperforating chronic bone abscesses are usually sterile or nearly so. Osteotomy is therefore not necessary for their cure. My method of treatment by simple evacuation through a small drill hole has been uniformly successful, in my experience, even in nonsterile cases.

151 Central Park West.

ABSTRACT OF DISCUSSION

DR. W. G. STERN, Cleveland: Attenuated metastatic bone abscesses are, I believe, a common experience with all of us in these days when osteomyelitis seems to be so much more prevalent (at least it is in the Central West) than it was five or ten years ago. With the amendment of using small trephine holes instead of drill holes, and with the amendment of using heliotherapy in the after-treatment, just as it is used in tuberculosis of the bones and joints, I agree with all that is said in the paper of Dr. Brickner. I have in the hospital at present a boy with his twenty-first metastatic bone abscess in the course of five years, and with the exception of one of these metastases, he was successfully treated in the way described by Dr. Brickner.

DR. F. R. OBER, Boston: Metastatic infection may give rise to infection in joints without symptoms. I have seen dislocations of the hip occur with a large abscess and attenuated organisms, without symptoms. It is not uncommon. The real problem in osteomyelitis is in the low grade chronic type with diffuse infections of the whole bone, many perhaps showing no bacterial growth on culture. The question is: Would one do the conservative operation on this, or would one resect the bone? If such a bone is opened and Carrel-Dakin treatment used, one will not get any better result than if the bone is opened and ordinary surgical drainage used. The Carrel-Dakin treatment will not reach all the parts of a shaft of a bone which contains diffuse infection, and I have had considerable experience with this method. I think that if one treats a case of diffuse osteomyelitis of a weight-bearing bone by treating it until the sinus discharges very little, and then let the patient get up and walk, reinfection or an extension of the infection of the bone over a long period of time will result; but if in a few cases of this so-called diffuse osteomyelitis the patients are put on Thomas splints, with a high sole on the other foot, and allowed to walk, one will be surprised in six months or a year to see how rapidly bone trabeculation approaches the normal and how rapidly the small sequestrums which could not be seen before become localized.

DR. J. W. SEVER, Boston: A number of years ago I reported a large number of cases of osteomyelitis, particularly some in which resections had been done, and in which regeneration had failed. At that time they were disappointments to me because I had been following Dr. Nichols' teaching, and I had expected better results. We do not do that any more, unless we want permanently crippled legs. The conservative, careful surgery that Dr. Brickner advocates is, I believe, the only thing to do in any type of osteomyelitis, acute or chronic. It is the only way that one will get satisfactory results, and it is the only thing surgically that really offers anything at all.

DR. FENWICK BEEKMAN, New York: I wish also to impress the necessity of conservatism in the operative treatment of osteomyelitis. We have seen at Bellevue a great many cases in which resection of the bones was done in other hospitals, and in the majority of them, regeneration had not taken place. We have now a child who has been in our wards for two and a half years who had a resection of the tibia. At present he has two stalactites, whose points are at least an inch apart. In the operative treatment of this condition, the pathology of the disease must be considered. First of all, there is the destructive period, when the infection is progressive. The destruction in this period is due to the toxins of the organism, and to the interference of circulation, this interference of circulation being due to thrombosis, the increased intramedullary pressure and to the stripping of the periosteum. The indications for treatment at this time are, first, to save life, and, secondly, to give a functional limb. To save life and to prevent the destruction of the bone, the pressure within the medullary cavity must be relieved, and this relief of pressure must be carried out with as little injury to the circulation as possible. I feel, therefore, that at this period an operation as simple as possible should be performed, and that is an incision in the soft parts with trephining of the bone to obtain free drainage. While the constructive period is progressing, it is at times necessary to drain either the soft parts or the bone to relieve abscesses that have formed. No attempt should be made to remove the sequestrum until it has fully formed, and then this should be done with as little injury to the soft parts (periosteum and bone) as possible. The best technic is usually to place the tourniquet on the limb, to cut down on one of the sinuses, to enlarge the opening of the cloaca and to tease out the fully formed sequestrum. When the sequestrum has been removed, the sinuses will usually heal rapidly. The difference between débridement of soft tissues and of bone is that the circulation of the soft tissue is in a direction of from within out, while the direction of the circulation to the bone is from without in; therefore, any radical operation on the cortex of a bone is going to destroy large blood vessels rather than the terminal ones.

DR. J. A. DICKSON, Cleveland: One point in connection with the treatment of chronic osteomyelitis that has not been mentioned is the use of the muscle flap. In a series of 100 cases in which operation was done by Dr. Dunn of Birmingham, radical sequestrectomy was done; the cavity was completely saucerized and either the muscle was rolled in to fill the cavity, or in the cases in which the cavity went right through the bone, a long pedicle muscle strip was used to fill the cavity. In that series of 100 cases, although in some of them anywhere from four to sixteen operations had been done, in 80 per cent. healing took place within five weeks. In the other 20 per cent. there were continuous sinuses or secondary sequestrums formed. With regard to acute osteomyelitis or localized abscesses, the ideal treatment has been outlined by Dr. Brickner; that is, just simple drainage in the large majority of cases will lead to excellent results. In other cases in which that does not happen, radical sequestrectomy with a muscle flap is very satisfactory.

DR. S. L. MCCURDY, Pittsburgh: It is to be hoped that all have read Macewen's work on bone growth and regeneration, in which he plainly states that bone growth cannot occur except in the presence of osteogenic cells; that like begets

like, and nerve tissue cannot regenerate bone any more than a muscle can regenerate a nerve. It has been demonstrated in my own practice in a number of cases that when a sequestrum was removed before beginning regeneration, there was no hope for new growth. In cases of osteomyelitis involving the entire length of the bone, the soft parts should be split open throughout the diseased area and dressed with salt solution until regeneration has occurred, which is usually in about two months. The sequestrum should be removed; the involucrum still attached to the soft parts should be cracked along the two sides and forced down into the cavity thus left. No packing should be used. In such cases bone regeneration occurs, the new bone usually being larger than the bone on the opposite side. Packing destroys blood clot organization, the essential to bone regeneration.

DR. W. M. BRICKNER, New York: I am glad that the methods I have attempted to crystallize here have been commended, and especially glad to hear from Dr. Stern that he has had such excellent results with my method of treating chronic bone abscesses. I shall not quarrel because he uses the trephine rather than the small drill; it is not a matter of great importance. With the chronic, presumed-to-be sterile abscess a small drill is all that is necessary to evacuate the pus; a trephine leaves a larger opening which takes that much longer to close. In acute osteomyelitis I use the trephine because I want a larger hole. I agree with Dr. Ober that the Carrel-Dakin treatment will not sterilize a diffuse osteomyelitis under any circumstances. It is helpful, however, in a discrete cavity or at least one that is surrounded with dense bone. It was not my purpose to decry plastic procedures as a means of curing persistent osteomyelitis with multiple sinus formation and necrosis. What I wanted to emphasize is that these plastic and other radical operations should not be undertaken at once. Many surgeons, orthopedic and general, do what I have objected to; namely, as soon as a chronic osteomyelitis manifests itself by the formation of a sinus, they assume that they must perform a radical operation, a saucerization, without waiting for a sequestrum to form. I say that one should wait until the sequestrum has fully formed and is loose; then remove the sequestrum, and in many cases one will not have to do anything further. But if, in the course of time, in spite of sequestrectomy, a more radical operation is needed, I certainly do not object to it; and among these operations, that spoken of, as developed by Chutro and others, of infolding of muscle, is certainly among the best. It was not that aspect of the treatment of osteomyelitis, however, that I essayed to discuss. The very radical operation of subperiosteal resection should be a last resort. It is far more serious for the patient to have an unregenerated bone, a flail extremity, than to continue through life with discharging sinuses, even if that were the alternative, which it is not. And a shortening of 3 inches is also a tragedy. There is one condition in which one may advisedly perform a primary subperiosteal resection—the rather rarely met acute osteomyelitis of the fibula.

I-Em-Hetep, Egyptian Deity of Medicine.—Hitherto medicine has recognized as its patronal deity the somewhat legendary Aesculapius, who is supposed to have lived at the time of the siege of Troy, but of whom no biographical details are extant. The new badge of the Reading Pathological Society represents the far more venerable Egyptian diety of medicine, I-em-hetep or Imhotep, whose name signifies "he who cometh in peace." This famous Egyptian lived about 2,900 years B. C., and was a learned, manysided man, who filled, amongst other offices, that of vizier to Pharaoh of the third dynasty named Zoser. Further, he was a noted architect, and built the earliest pyramid known to history, the Step Pyramid of Sakkarah, near Cairo. Above all, however, he was distinguished as a physician, and so impressed his fellow countrymen with his skill in the ars medendi that he was eventually acknowledged and worshipped throughout Egypt as the deity of medicine. In his honor temples were erected in various parts of the country, and to them flocked patients from far and near. Many miraculous cures are reputed to have taken place at his shrines.—*Brit. M. J.* **2**:788 (Oct. 17) 1925.

EXPLOSIONS OF ANESTHETIC GASES

A METHOD FOR THE CONTROL OF ELECTROSTATIC CONDITIONS

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Shortly after the introduction of ethylene-oxygen for anesthesia in the Presbyterian Hospital, March 14, 1923, two minor explosions occurred in the delivery room. The first one took place when the breathing tube and cone were placed on the head of the machine; the other one occurred while the anesthetist was holding the cone preparatory to its application to the patient's face. In the first instance, a spark was produced when the metal on the tube came in contact with the metal on the head of the machine. In the second case, the anesthetist thought it probable that he had struck the metal table with the cone, causing a spark. No further trouble was experienced for nearly a year, when two explosions occurred within two hours in different operating rooms. The first of these two explosions occurred when an assistant's gown brushed against the breathing tube in passing, and the other took place when the tube was being changed from one machine to another. The fifth ethylene-oxygen explosion, similar to the fourth, occurred when the breathing tube was being attached to another machine. No damage was done to any one.

Becoming exercised over these explosions, we substituted nitrous oxid-oxygen for ethylene-oxygen. Within a few weeks two explosions occurred with this gas. The first of these took place when the patient and gas machine were being wheeled into the operating room during anesthesia. The anesthetist (an intern) was unable to give any definite information regarding the cause, but thought that the cone had been kept on the face during the trip into the operating room. The second explosion during the administration of nitrous oxid-oxygen occurred at the completion of an administration, when the breathing tube was being disconnected from the machine.

The gases were flowing at the time of all the explosions. With the exception of the first two explosions, there was ether in the ether chamber of the gas machine; and in one of the nitrous oxid-oxygen explosions, and two of the ethylene-oxygen explosions, it became ignited and damaged the head of the machine. Following the explosions, the gases were immediately turned off at the tanks. However, the flame exhibited no tendency to pass up the tubes connecting the tanks and the machine. This proved that neither ethylene unmixed with oxygen nor nitrous oxid unmixed with oxygen and ether forms explosive mixtures. The burning ether was put out with a fire extinguisher, which is kept in the hall adjacent to the operating room.

In each explosion the breathing tube was broken in one or more places. Fortunately, with the exception of some discoloration about the eyes of one of the patients to whom nitrous oxid-oxygen was being administered, no patient was injured nor was any anesthetist or person in the room harmed.

It is interesting to note that when the machine contained no ether, the ethylene-oxygen burned with a small blue flame at the point of exit from the machine,

which was easily extinguished by blowing it out with the breath. All of the explosions occurred during cold, dry weather when the humidity in the operating room was low.

On account of the great value of ethylene as an anesthetic agent, we were loath to abandon its use. After several months of vain effort on our part to control static spark in the operating rooms, we were much delighted when the testing department of the Commonwealth Edison Company consented to attempt to work out the problem. The result of their studies follows:

From the descriptions of the explosions that occurred in the Presbyterian Hospital and similar occurrences elsewhere, it seems fairly conclusive that they were caused by electrostatic sparks in the presence of an explosive mixture. An article [1] has been published, giving the explosibility of ether, ethylene, nitrous oxid and oxygen under various conditions. The fact that an explosive mixture may result under certain conditions is generally accepted. In order to understand the method used to prevent electrostatic sparks, some of the general conditions of the hospital will be explained. Many of the hall floors are covered with linoleum. In May, 1925, when not much heat was required from the steam heating system, it was found that if a nurse touched a grounded water pipe and walked down the hall, on returning to the water pipe she was electrically charged with respect to the water pipe.

This showed that walking along the floor developed an electrostatic charge. Some of the hospital carts have around the upper part a heavy rubber designed to take the jar in case of collision. It was found that this rubber and some of the iron in carts standing around on the floor were charged. A section of the rubber could be discharged by touching it with the hand while the other hand was on the water pipe, but a section of the rubber an inch or two away still remained charged.

The indications were all obtained with an electroscope. It was thought in the beginning that a laboratory type of sensitive electroscope would be required to obtain indications of charge, but such was not the case, as strong indications were obtained with an ordinary pocket type. These indications obtained on the nurse and wagon brought out the fact that whatever charge might exist in the operating rooms, it is possible and even probable that some charges are brought in from the outside.

The large operating room in which several of the explosions occurred has a floor of white tile set in concrete. Generally, sterilizing in the adjacent room is done before or after operating hours. During operations, while steam heat is used in the building, the relative humidity in the operating room has been about 31 per cent. While sterilizing is in process, the humidity is higher.

In this room with relative humidity of from 30 to 40 per cent., at times if a person touched the grounded water pipe, walked across the tile floor and returned to the water pipe, he became charged with respect to the pipe.

This showed that at times the tile floor acted as a fair insulator; otherwise the charge would neutralize through the floor to the water pipe. This is not surprising if we remember that tile is somewhat similar to porcelain, one of the best electrical insulators. These tiles are set in concrete which, so far as is known, contains no general embedded, grounded reinforcing mesh. Tests made in another hospital showed that charges could be similarly developed in the operating room.

If the humidity could be kept high enough in the operating rooms, it might be difficult to develop electrostatic charges, and any charges brought in from outside would leak off. The drawbacks to a high humidity plan are, first, that the humidifying system would need constant watching and a drop in the humidity might pass unnoticed and prove disastrous; and, second, that a high humidity at the temperature maintained in the operating room would render working conditions very uncomfortable. In considering the prevention of explosions, it was felt that a system was desirable which would not require constant supervision and which, at the same time, would cause no discomfort to those concerned.

The next plan considered and the one finally chosen was that of having all objects on which a charge might exist connected together by a metallic connection and held at a standard potential, such as ground. (The hospital uses a gas machine equipped with two rubber gas bags and a heavy rubber breathing tube with a rubber face cone.)

In making tests, the gas machine was charged in the operating room by operating an electrostatic machine close to it. On one occasion, after the machine was charged, the breathing tube was removed and placed on a marble-topped table equipped with iron legs, which rested on the tile floor. A half hour later, when this tube was tested, the electroscope indicated a strong charge.

Further tests showed that the cone, breathing tube and rubber gas bags would retain charges for a considerable time, and also that, although one section of the rubber might be discharged, another remained charged.

These points, in connection with the fact that four of the seven explosions occurred when the tube came in contact with some object, indicated that a considerable charge had existed on the tube, and that some steps should be taken to discharge the tube and all rubber parts of the machine. This was accomplished by placing brass chains in the netting covering the bags and a spiral wire around the tube. These made metallic contact with the other parts of the machine. The inner surface of the breathing tube has a spiral wire partly embedded in it. Tests using low voltage showed that almost every point of the inner surface had a metallic contact with the metal connections on the end. However, this inner spiral wire did not prevent the accumulation of a charge on the outside of the tube. A published article [2] stated that in a certain hospital effectual grounding has been obtained through damp towels, placed on a tile floor, touching the metallic parts of the machine. Tests in this case, however, showed that even with wet towels a considerable charge could be maintained on the gas machine with a nearby static machine. Because of this point and of the fact that charges might be brought in from outside as well as developed by walking across the floor of the operat-

1. Brown, W. E.: Explosibility of Ethylene Mixtures, J. A. M. A. 82: 1039 (March 29) 1924.

2. Lewis, W. B., and Boehm, E. F.: Simple Method of Eliminating Danger of Explosion Due to Static Spark in Gas-Oxygen Apparatus, J. A. M. A. 84: 1417 (May 9) 1925.

ing room, the conclusion was reached that a positive grounding system was needed, one which would always give a dependable ground, which would ground any person or apparatus brought up to the operating table or gas machine, and which would not require constant watchful supervision.

It was decided that the best plan at the time would be the installation on the floor of a sheet of steel large enough to accommodate surgeons, anesthetist, nurses, operating table and gas machine. The sheet was installed and is of such size that any person approaching the gas machine or operating table will first be grounded by stepping on the outer margin of the metal plate. Later, the following floor plan was devised and is being installed: The floors and base are to be what is commonly known as cloisonné terrazzo, similar to the kind of floors used in some of the large rooms in modern hotels. Briefly, it consists of small squares of terrazzo separated by narrow brass strips. For our purposes these strips are placed 5 inches on centers each way, and are slotted together at the intersections. After the terrazzo material has hardened, the entire surface is ground down to a smooth finish, which brings the edges of the strips flush with the floor. The general appearance is that of a tile floor except that the joints are brass instead of cement. This grille of brass strips is electrically connected together and then grounded to the water pipes. Each piece of movable equipment, such as tables, stands and anesthetizing machines is equipped on the under side with several small link brass chains which are long enough to drag on the floor for several inches. Regardless of the position of the equipment on the floor, at least one of these chains will be in contact with a brass strip; thus all are grounded and a difference in potential is impossible. The smallness of the squares of terrazzo also grounds the operators and assistants as they move about in their regular routine of work, which eliminates the possibility of an assistant going to another room or ungrounded equipment and bringing back a charge of different potential.

A summary of the points of the system which was devised to prevent static follows:

1. A grounded metal plate of nonrusting furniture steel large enough to accommodate the operating table, the staff and the gas machine, with an unused margin on all sides is being used while the floor described above is being installed.

2. Chains and wire are used as a covering for the rubber bags and the breathing tube, and are connected to the metal frame of the machine. A metal frame and metal prongs have been installed over the celluloid in the face cone. This metal frame, through the breathing tube or the wire wrapping and embedded wire, is connected by metal to other parts of the machine.

3. Pendent brass chains, two or more in each case, are fastened to the axles of the operating table and the gas machine, to ground them to the metal floor plate.

4. Two strips of metal mesh about 18 inches long and one-half inch wide are connected to the metal of the under side of the operating table. One strip has a small metal plate on the free end, which is placed under the patient to ground him to the table. The other strip is thrown over the shield at the patient's head.

5. A rubber mat on the base of the machine is removed or holes are cut in it so that the gas tanks have a good metallic connection to the base. Gas hose encased in spiral wire is connected to the metal of the machine.

With this system no indication of charge could be obtained on any of the protected apparatus when an electrostatic machine was operated nearby, while without the system, strong indications were obtained, which in some cases remained for a considerable time on rubber parts.

In the new operating rooms now under construction, there is being installed a crosswork system of grounded copper bars, cloisonné, 4 inches apart, the top edges to be even with the top of the terrazzo floor. These bars will take the place of the metal plate.

Experiments also are being carried on to find whether a rubber which is a partial electrical conductor can be used and the chain or wire covering dispensed with.

It has been found that if the breathing tube with the internal wire is wrapped externally with wire having one-eigth inch between turns, this external wire is efficient in dissipating an electrostatic charge. The wire is more desirable than mesh covering because of its lighter weight. Experiments have proved that metallic paints, such as aluminum, cannot be used for this purpose, as they are not electrical conductors.

Experiments seem to confirm the belief that this system of grounding and electrical interconnection will prevent electrostatic sparks.

While it may seem that the matter of connections has been entered into with considerable detail, and that fine points have been followed to the extreme, it was felt that, to be on the side of absolute prevention and protection, a conclusion should be reached on every point that could be foreseen.

The following suggestions of Dr. E. I. McKesson do not conflict with the foregoing precautions and may be employed to advantage in conjunction with them:

1. One should shut off the ether evaporizer valve, turning to the word "Fill," and shut off the mixing valve by placing it at 100 per cent. air at the close of any anesthetic. This prevents the movement or delivery of all gases through the apparatus.

2. The inhaler and breathing tube should be washed out with water at a faucet immediately *before* starting an anesthetic. This is done for three purposes: (*a*) It promotes cleanliness; (*b*) it removes static electricity from the anesthetist who washes it, and (*c*) it removes static and combustible vapors from the mask and tube.

3. The anesthetist should attach the tube to the apparatus and at once apply the mask to the patient's face, bringing the hand into contact with the patient's face, thus neutralizing any static between the patient, the anesthetist or the inhaler. If a spark should be discharged from the patient, no harm is done, since there is still no combustible vapor present.

4. Now the anesthetic is turned on. From this moment the patient, the anesthetist and the apparatus are, of necessity, in almost constant contact throughout the operation, preventing any discharges of sparks.

5. As the operation is completed, the anesthetist should turn off the ether or the ethylene by setting the mixture valve at 100 per cent. air, remove the tube and inhaler from the apparatus, again wash them out with water at the faucet, and hang them up in a vertical position to permit of ventilation until the next anesthetic is to be given.

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THE USE OF ETHER IN PERTUSSIS BY INTRAMUSCULAR AND RECTAL INJECTION *

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The use of ether by intramuscular injection was first suggested by Audrain [1] in 1914. Besides advocating its use in pertussis, he was no less enthusiastic concerning its efficacy in infections, such as scarlet fever, measles and bronchopneumonia. He believed, in the case of pertussis, that it exerted a specific bactericidal effect on the Bordet-Gengou bacillus.

In the last five years, an increasing number of writers have almost unanimously testified to the usefulness of ether in pertussis, their degree of enthusiasm varying from that of Castorina,[2] who feels that the problem of the treatment of whooping cough is now on the road to a definite solution, and that "results obtained with vaccinotherapy and intramuscular injection of ether lead us to hope that we are at last in possession of an efficacious means of combating this serious disease," to the more conservative conclusions of Macciotta,[3] who feels that ether therapy in pertussis exerts only a transitory and variable antispasmodic action which is not constant, and that it is therefore not to be taken as a decisive stroke in the cure of such a severe illness "except that it represents a step forward and a therapeutic measure not to be despised." He feels that it does not justify the exaggerated enthusiasm that some authors have shown, and thinks that in some instances the results from vaccinotherapy are not to be disregarded. Bedo [4] noted an apparent cure in two children with pertussis who had been given a general anesthetic for an operation long before any reports on ether treatment in whooping cough had been published. He observed rapid subsidence of the symptoms, but suggests that on account of the pain of intramuscular injection the procedure be restricted to severe cases and to young infants. Tow [5] concludes that ether injected intramuscularly is a valuable drug in the treatment of pertussis, and reports relief in 82 per cent. of sixty-one cases, in which the number and severity of paroxysms were reduced, sleep and appetite improved and vomiting was lessened.

The technic generally consists of the injection of from 1 to 2 c.c. of ordinary sulphuric ether, usually into the gluteal region either daily or on alternate days, some authors using three injections, others more. The danger of producing necrosis by the use of this method can never be lost sight of; thus Tow,[5] in a series of 385 injections, had eight instances in which necrosis followed.

During the past year, I have used ether by intramuscular injection in eighteen cases of whooping cough. On account of the severe though momentary pain, and the risk of necrosis, I have confined the use of this measure to the most severe cases. The number of injections given was six in one case, five in three cases, four in two cases, three in eleven cases and one in one case. Injections were given on alternate days, the initial dose being 2 c.c. to the older children and 1 c.c. to the infants, increasing to a maximum of 2, 2.5 or 3 c.c. Ether was noted on the breath within a minute or two after the injection and remained quite noticeable for six or eight hours. No necrosis occurred in this series of sixty-three injections, but one child developed swelling and redness at the site of the injection and showed some induration of the buttocks for about three months afterward.

Results in these eighteen cases were generally good. What might be called a cure resulted in three cases; by this I mean that immediate and lasting improvement occurred immediately following the treatment. These three cases, however, were all well advanced in the disease—beyond their sixth week—although they showed no signs of a remission in the severity of their symptoms. The extreme severity of the paroxysms, the vomiting and the sleepless nights were as bad when the patients presented themselves for treatment as they were at the height of the disease. The results in these three cases were dramatic.

Definite improvement occurred in ten children, and slight improvement in two, making a total of fifteen out of eighteen cases, or 83.3 per cent., in which improvement was seen. This corresponds quite closely to Tow's record of 82 per cent. of cases in which improvement was noted. No noticeable result was seen in two cases; the patients were members of the same family, 5 and 7 years old, respectively. Both children were so terrified by the procedure that the fear of the injection and the intense accompanying nervousness nullified any benefit that might have resulted. One infant, aged 2½ weeks, died. This child contracted whooping cough when he was a little under 2 weeks old. No benefit was seen from this treatment.

The cases that showed the greatest benefit were the ones well on in the paroxysmal stage; one was that of a child, 1 year old, in the sixth week of extremely severe whooping cough, who with each paroxysm became cyanotic and lost consciousness. This child was given a single injection of 3 c.c. of ether with instant cessation of the paroxysms and with a change to an ordinary severe cough, with an occasional whoop. Another was an infant, 7 weeks old, in the third week of pertussis; six injections in all were given, beginning with 1 c.c. and increasing to 2 c.c. on alternate days. The whoop disappeared after the second injection. The mother observed a tendency for the cough to become more severe as the effect of the ether wore off and was quite positive concerning the immediate benefit of the ether. Another child, 15 months old, in the fifth week of cough, was weak, emaciated and listless. When seen for the first time she had been unable to retain any food for several days; each paroxysm, and they were very numerous, left her limp and bathed in perspiration; her condition seemed precarious. Four injections of 2 c.c. of ether each on alternate days effected a startling change in the child, the vomiting ceased, the appetite returned and the number and severity of the paroxysms were greatly diminished. An older child, aged 5 years, in the fourth week, had paroxysms of the greatest severity at about half-hourly intervals during the day; the nights were indescribably bad; vomiting occurred whenever food was taken. After the first injection no benefit was seen, but after the second both the paroxysms and the vomiting suddenly stopped and did not return. The child coughed for about three

* Read at the Third Annual Meeting of the Canadian Society for the Study of Diseases of Children, Ottawa, June 5, 1925.

1. Audrain, J.: Le traitement de la coqueluche par l'ether, Bull. et mém. Soc. méd. d. hôp. de Paris **44**: 795 (June 11) 1920.
2. Castorina, G.: The Ether Treatment of Whooping Cough, Pediatria **31**: 151 (Feb. 1) 1923.
3. Macciotta, G.: Ether in the Treatment of Whooping Cough, Pediatria **32**: 159 (Feb. 1) 1924.
4. Bedo, J.: Ether in the Treatment of Whooping Cough, Ztschr. f. Kinderh. **35**: 325 (June) 1923.
5. Tow, A.: Intramuscular Use of Ether in Pertussis, Am. J. Dis. Child **29**: 477 (April) 1925.

weeks after that, but without a whoop and without vomiting, and sleep was practically undisturbed.

The other children in this series all showed some benefit, but not nearly as marked as was seen in those just cited. The improvement was sufficiently definite, however, to warrant a belief that ether in pertussis is a valuable remedial measure; whether specific or sedative only, I shall discuss presently.

I have said that no necrosis occurred in any of the cases treated, but that one local reaction was seen; nevertheless, the fear of the development of necrosis is sufficient to prevent one from using ether by intramuscular injection in any but the more severe cases of pertussis. Tow's series showed eight instances of necrosis in a total of 385 injections. It is a small percentage, to be sure, but I imagine it would be difficult to convince a mother that the development of a slough in the buttocks was part of the most modern treatment of whooping cough.

TABLE 1.—*Ether by Intramuscular Injection*

Case	Age	Stage of Disease	No. of Injections	C.c. in Each Injection	Result and Comment
1	8 yr.	Paroxysmal	3	2, 2, 2	No result
2	6 yr.	Paroxysmal	3	2, 2, 2	No result
3	4 yr.	Late catarrhal	3	2, 2, 2	Better nights; cessation of vomiting
4	3 yr.	Late catarrhal	3	2, 2, 2	Better nights; cessation of vomiting
5	1½ yr	Severe paroxysmal	3	1.5, 2, 2.5	Rapid control of paroxysms; good nights
6	7 yr.	Severe paroxysmal	3	2, 2, 2	Rapid control of paroxysms; good nights
7	4 yr.	Extreme paroxysmal	3	2, 3, 3	Immediate control of severe vomiting and extreme paroxysms; good nights; almost complete cure
8	6 mo.	Paroxysmal	3	1, 2, 2	Better nights; control of vomiting; shorter course, four weeks
9	8 mo.	Paroxysmal	3	1, 1.5, 2	Good nights; control of vomiting
10	14 mo.	Late paroxysmal	5	1, 2, 2, 2, 2	Complete cure
11	16 mo.	Severe paroxysmal	1	3	Immediate and lasting improvement
12	7 wk.	Paroxysmal	6	1, 1.5, 2, 2, 2, 2	Immediate relief; good nights; no vomiting
13	2 yr.	Paroxysmal	3	1, 2, 2	Control of vomiting; fair nights
14	2 yr.	Paroxysmal	3	1, 2, 2	Moderate improvement, not marked
15	4 yr.	Paroxysmal	4	2, 2, 2, 2	Definite improvement; good nights
16	15 mo.	Paroxysmal	4	2, 2, 2, 2	Definite improvement; good nights
17	1½ yr.	Late paroxysmal exhaustion	5	1.5, 2, 2, 2, 2	Control of vomiting; paroxysms better; good nights
18	2 wk.	10 days	5	1, 0.5, 2, 2, 2	No improvement; died

I have felt that this risk of necrosis was one of the main drawbacks of the ether treatment, another being the intense, though momentary pain occasioned by the injections.

It occurred to me that since the benefit that was derived from this treatment was in all probability the result of the excretion of the ether in the pulmonary alveoli, and the bathing of the respiratory mucous membrane in a weak solution of ether, any method of administration that would effect a similar excretion through the pulmonary alveoli should show similar results. What seems important is that the ether be delivered from the blood to the alveoli. Accordingly, I chose the method of giving the ether in olive oil by rectum as in all probability being as good as the intramuscular route. The method is by no means new, for ether anesthesia by rectal administration in olive oil has been in use for years, though it has never attained great popularity. Since starting this work I found that Mason[6] reported having used high rectal injections of 6 c.c. of a 40 per cent. solution of ether in olive oil in four cases, with benefit in two.

In order to determine whether a weak solution of ether in oil was irritating or not, twenty-six children in the wards of the Children's Memorial Hospital, not suffering from pertussis, were given 15 c.c. of olive oil containing 1, 2 and 5 c.c. of ether. In no instance was it found to be irritating. It appeared on the breath in from two to twenty minutes and remained quite noticeable on the breath for from four to six hours. The solutions were generally well retained, in most instances for several hours, but for very short periods in the case of very young infants. An interesting observation was in an infant aged 6 months, who was given 15 c.c. of olive oil with 2 c.c. of ether, which was retained not longer than one minute, on whose breath the ether was quite evident for upward of one and a half hours.

These observations would indicate that children can tolerate weak solutions of ether in olive oil by rectum quite well, and that sufficient ether is absorbed, even if it is kept only a short time, to render the breath quite ether-laden for a considerable period of time.

The advantages of this method are obvious. The treatment can be easily administered by the mother or the nurse. The child is not in fear of a painful intramuscular injection. The dangers of necrosis are completely eliminated and the treatment can be continued without harm for a much longer time.

Twenty-one children with whooping cough have been treated by this method. I have used 1 dram (3.75 c.c.) of ether to the ounce (30 c.c.) of olive oil, one-half ounce (15 c.c.) being injected into the rectum twice daily. The results compare favorably with the intramuscular series. It should be noted that the two groups do not represent identical types of cases. The intramuscular group, with two exceptions, were all well advanced severe cases in which this measure was resorted to as a means of seeking some little relief. Many cases of pertussis were seen during this period in which ether was not tried. When I began using ether in oil by rectum, on the other hand, it was prescribed in all cases as a simple and easily administered remedy. This group, therefore, represents a mixture of the milder and more severe, and of the early and later types.

Thirteen of the twenty-one cases, or 61.9 per cent., showed marked improvement, as was evidenced by a lessened number of paroxysms, control of vomiting and more restful nights. In seven of these the improvement amounted to an almost complete cessation of the whoop and almost wholly undisturbed nights. Slight but definite improvement was seen in six cases, or 28.7 per cent., and no appreciable result in two cases, or 9.5 per cent. The total percentage of cases, therefore, in which some improvement was demonstrable was 90. In all, the best results were seen in the children whose cough had progressed well into the paroxysmal stage; that is, after the infectious period when the symptoms are due to spasm and excessive irritability of the larynx, rather than to the direct action of a specific micro-organism. It is in this stage that one would expect a nonspecific sedative remedy to show its greatest effect. Particularly is this true in the more severe cases in which extraneous factors, such as nervousness, tend to maintain the severity of the cough beyond its usual time.

6. Mason, C. C.: The Treatment of Pertussis with Intramuscular Injection of Ether, J. A. M. A. 81: 2114 (Dec. 22) 1923.

In this series it was possible to continue the ether treatment over a period of one or two weeks, injections being given morning and night without apparent harm. No drowsiness was noted in any of the cases, nor was rectal irritation complained of. The most marked improvement in the series was seen in the control of vomiting, for this was either lessened or completely controlled in thirteen of the cases, while better nights were reported in eleven of the twenty-one cases.

One of the best results seen in this group was in an infant, 2 months of age (still under treatment), who can be kept completely under control with 2 c.c. of ether in oil for a period of six or eight hours. Until the effect of the ether wears off, the child scarcely coughs, takes his food well and sleeps well. As the effect wears off he suffers a number of distressing paroxysms and vomits once or twice until the ether is given again.

TABLE 2.—*Ether in Olive Oil by Rectum*

Case	Age	Stage of Disease	Injections	C.c. in Each Injection	Result and Comment
1*	7 yr.	Paroxysmal	28, twice daily	2	Unquestioned relief; aggravation noted whenever ether was omitted; no vomiting; good nights
2	8 yr.	Early paroxysmal	28, twice daily	2	Early disappearance of whoop; vomiting; slept all night after one week
3*	5 yr.	3 months	20, twice daily	2, 3	Improvement after one week, then returned; peribronchial glands
4*	7 yr.	Early paroxysmal	14, twice daily	2	Slight relief; complicated by measles
5*	5 yr.	Early paroxysmal	14, twice daily	2	Slight relief; complicated by measles
6	1 yr.	Paroxysmal	14, twice daily	2	Slight relief; control of vomiting
7	6 yr.	Paroxysmal	10, twice daily	2	Slight relief; control of vomiting
8	1 yr.	Paroxysmal	14, twice daily	2	Very moderate relief
9*	5 yr.	Paroxysmal	20, twice daily	2	Marked relief; good nights; no vomiting
10	5 yr.	Paroxysmal	14, twice daily	2	Somewhat better nights
11*	6 yr.	Paroxysmal	14, twice daily	2	No vomiting; good nights
12*	3 yr.	Paroxysmal	14, twice daily	2	No vomiting; good nights
13	2 yr.	Paroxysmal	14, twice daily	2	No improvement
14	2 yr.	Paroxysmal	20, twice daily	2	Good nights; less frequent paroxysms; no vomiting
15*	4 yr.	Paroxysmal	14, twice daily	2	Considerable improvement; vomiting controlled; good nights
16*	1½ yr.	Paroxysmal	14, twice daily	2	Considerable improvement; vomiting controlled; good nights
17*	2 mo.	Paroxysmal	6, twice daily	2	No vomiting; very good nights when ether is given
18	2 yr.	Late paroxysmal	10, twice daily	2	Immediate relief; good nights; vomiting stopped
19	1 yr.	Late paroxysmal	10, twice daily	2	Good nights; severity of paroxysms controlled
20	2 yr.	Late paroxysmal	10, twice daily	2	Good nights; severity of paroxysms controlled
21*	1½ yr.	Early paroxysmal	4, twice daily	2	Good nights; no vomiting

* Still under treatment.

The beneficial action of ether depends on its excretion through the pulmonary alveoli and can be compared to the beneficial action of inhalations in other forms of laryngeal inflammation, in which the affected area is bathed in an atmosphere laden with the inhaled vapors. The only difference here is that in the case of ether the remedy is exhaled, but the underlying principle is doubtless the same. To attribute any specific bactericidal action to ether in the necessarily weak dilutions in which it is present in the expired air is largely speculative, and must await scientific proof; meanwhile, the more logical belief, that it is purely and temporarily sedative and transitory, seems more in accord with my experience. For instance, in several instances, mothers have volunteered the information that omitting the ether for a single night caused a return of the paroxysms with their usual severity.

The results shown here, as well as the generally favorable results reported by other writers, should make one feel that ether therapy in pertussis, though by no means a cure, is still a valuable adjunct to our therapeutic armamentarium in this dreaded disease. A measure which will bring any relief at all to two infants with whooping cough, one 7 weeks of age and one 2 months of age, as it unquestionably did in two of the cases here reported, can under such circumstances almost be called life saving.

If, therefore, ether is valuable at all, and if its effect depends solely on its presence in and excretion from the pulmonary alveoli, the advantage of the rectal over the intramuscular method is obvious.

We have a harmless remedy in the doses given, of which the patient is totally insensible, which exerts its sedative action continuously over a period of hours, and which by rectal injection in olive oil can be easily and repeatedly administered by the mother.

We can conclude with Macciotta that the ether treatment is a "therapeutic measure not to be despised"; and one might add that by the rectal method of administration, it has truly been robbed of its sting.

143 Crescent Street.

INFLUENCE OF FOCAL INFECTION AND THE PATHOLOGY OF ARTHRITIS

RESULTS OF EXPERIMENTS *

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Our purpose in this communication is to present experimental data that bear on the nature of the influence of focal infection and the pathology of arthritis. Some phases of the work also throw light on carbohydrate metabolism, and this aspect has been discussed elsewhere.[1] In order to make plain the significance of the experiments and the reasoning that has led up to them, a brief summary of some previous work will be necessary. This summary, together with new data, will be taken up in the following order:

1. The sugar tolerance in arthritis.
2. The blood gases in arthritis.
3. Absorption from the gastro-intestinal tract in arthritis.
4. The influence of the circulation on the sugar tolerance in arthritis.

In view of the interdependence of the several parts of the present studies a certain amount of repetition will be unavoidable.

* Read before the College of Physicians, Philadelphia, June 3, 1925.
* From the Laboratory of Clinical Chemistry, Presbyterian Hospital. The work here reported is part of a study on chronic arthritis in collaboration with Robert B. Osgood, M.D., of Boston. The expenses of the investigation were defrayed by contributions from several sources, including a number of patients.

1. Cajori, F. A.; Crouter, C. Y., and Pemberton, Ralph: J. Biol. Chem., to be published.

THE SUGAR TOLERANCE IN ARTHRITIS

In the course of a study of chronic arthritis in the army, it was demonstrated by Pemberton and Foster [2] that a lowered sugar tolerance accompanies this disease in more than 60 per cent. of all cases. We have found a low sugar tolerance in 53 per cent. of seventy-seven arthritic patients in civil life. Comparable results have been reported by Holsti,[3] Fletcher,[4] Warfield [5] and Hench.[6]

Observations in a long series of cases showed that this lowered tolerance is more or less proportional to the severity of the arthritis. It was also shown that as arthritic patients improve, irrespective of the measures accomplishing improvement, the lowered tolerance returns or tends to return to normal. It was also shown, however, that this return to normal is most abrupt after the removal of a causative focus of infection. This point is well illustrated in the example of a soldier, aged 19, with acute arthritis of one hip and greatly diseased tonsils: February 27, after he was

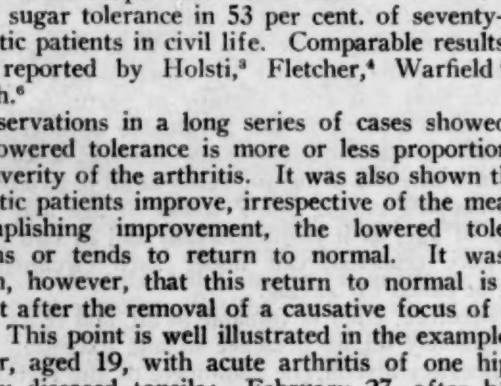

Chart 1 (Case 10).—Effect of postural interterence with the circulation on sugar tolerance. Broken line, limbs elevated; solid line, normal position.

fed 100 gm. of glucose, the sugar reached 190 mg. per cubic centimeter. Two weeks later, March 14, his tonsils were removed, and he made a prompt recovery from the arthritis. March 28, two weeks after his tonsillectomy, a study of his sugar tolerance gave a normal curve. As a corollary to this can be cited the case of a large robust soldier studied as a normal control, in whom a normal sugar tolerance was obtained, the blood sugar not rising above 127 mg. per cubic centimeter. Fourteen days later, however, he developed an acute frontal sinusitis, and three days after the onset of this a lowered sugar tolerance was obtained, the blood sugar reaching 185 mg. per cubic centimeter, with a slight glycosuria.

As remarked above, a lowered sugar tolerance in arthritis may return to or toward normal, following the institution of other successful measures of therapy, such as the use of nonspecific protein or the application of a lowered caloric intake.[2]

It is clear, therefore, that a lowered sugar tolerance stands in close relation to the phenomena of arthritis, on the one hand, and the influence of frank focal infection, on the other.

A lowered sugar tolerance, however, is by no means specific for arthritis. It was observed by Hamman and Hirschman [7] to stand in some relation to certain thyroid disturbances, and it has been observed to accompany furunculosis.[8] It has been regarded as accompanying certain other nondiabetic conditions, but the evidence as to this is not final, and it seems probable at present that in some of these, at least, it is a function of an unrecognized inflammatory process or focal infection. This point is brought out in a series of miscellaneous causes studied by Pemberton and Foster.[2]

Attention has been called elsewhere [1] to the fact that the lowered sugar tolerance of arthritis differs from that seen in diabetes in that there is no failure of combustion of glucose,[9] and that the characteristic effect of insulin is evidenced by a fall in blood phosphorus.[1] Up to a certain renal threshold [2] there is no glycosuria, and observation of arthritic patients over a long series of years shows that they develop nothing of the diabetic syndrome. In fact, it has been shown by one of us [10] that the combination of arthritis and diabetes is at least unusual, and severe coincident examples of each have not been encountered. It will be shown later that the low sugar tolerance here under discussion can arise by a different process.

Attention is here directed at considerable length to the mechanism of a lowered sugar tolerance because of the degree to which it parallels arthritis, and because of the paucity of data reflecting the dynamic pathology of this disease. It was believed that data elucidating this mechanism would contribute importantly toward an understanding of arthritis.

THE BLOOD GASES IN ARTHRITIS

Attention has been called previously [11] to the fact that measures which increase the local or systemic blood flow or the systemic metabolism tend to have a favorable influence on the rheumatoid syndrome. Examples of this are to be seen in the effects of massage, exercise and the application of external heat.[12] Studies were therefore carried out on the respiratory functions of the blood with the aim of seeing whether these are at fault in arthritis. In a series of such studies by Pemberton, Hendrix and Crouter,[13] no disturbance of the dissociation curves of the blood for oxygen or carbon dioxid could be detected, but it was observed that during the conduction of a test revealing a lowered sugar tolerance, there takes place in most cases a rise in the percentage saturation of that blood with oxygen. That is to say, the ratio of the oxygen content to the oxygen capacity increases, which means that more oxygen is left unutilized. It was further observed that a small difference in the percentage saturation of the peripheral venous blood with oxygen existed between groups of normal persons and the groups of arthritic patients studied. The series has since been extended and now

2. Pemberton, Ralph; and Foster, G. L.: Studies on Arthritis in Army, Based on Four Hundred Cases, Arch. Int. Med. **25**: 231-282 (March) 1920.
3. Holsti, O.: Acta. med. scand., supp. **3**: 137, 1922.
4. Fletcher, A. A.: Dietetic Treatment of Chronic Arthritis and Its Relationship to Sugar Tolerance, Arch. Int. Med. **30**: 106 (July) 1922.
5. Warfield, L. M.: J. Michigan M. Soc. **22**: 461 (Nov.) 1923.
6. Hench, P. S.: Atlantic M. J. **28**: 425 (April) 1925.
7. Hamman, Louis; and Hirschman, L. L.: Blood Sugar, Arch. Int. Med. **20**: 761 (Nov.) 1917.
8. Olmsted, W. H., and Gay, L. P.: Study of Blood Sugar Curves Following a Standardized Glucose Meal, Arch. Int. Med. **29**: 384 (March) 1922.
9. Cecil, R. L.; Barr, D. P., and Du Bois, E. F.: Clinical Colorimetry: Observations on Metabolism of Arthritis, Arch. Int. Med. **29**: 583 (May) 1922.
10. Pemberton (Footnote 11).
11. Pemberton, Ralph: Am. J. M. Sc. **166**: 833 (Dec.) 1923.
12. Pemberton, Ralph; Cajori, F. A., and Crouter, C. Y.: Physiologic Effect of Massage, J. A. M. A. **83**: 1761 (Nov. 29) 1924.
13. Pemberton, Ralph; Hendrix, B. M., and Crouter, C. Y.: J. Metabol. Res. **2**: 301 (Sept.) 1922.

includes 132 arthritic patients and fifteen normal persons. The average percentage oxygen saturation of hemoglobin for the arthritic group was 56, and for the normal, 43. The figures for normal persons are in general consonance with those obtained by Cullen and Robinson.[14] They obtained an average of 53 per cent. on twenty-three supposedly normal students who had, however, partaken of a moderate breakfast, in contrast to the normal persons studied by us, who were fasting. Our figures and those of Cullen and Robinson are lower than those of some other workers.[15] This difference is presumably due to a number of factors not wholly understood, but in the present connection we are concerned only with a comparison of the arthritic and normal bloods obtained under identical conditions. The difference between the average for the normal group and the arthritic group is small and will not bear much emphasis; but on analyzing the figures for arthritic patients, from which the average for that group was made up, it appears that some cases gave higher figures than were ever shown by normal individuals. Thus, the range for the normal group is from 27 to 67 per cent., and for the arthritic, from 25 to 95 per cent. There is, therefore, limited but definite evidence that the peripheral venous blood in arthritic patients may show a higher percentage saturation with oxygen than occurs in health, under similar conditions. Some explanation of this is afforded by the following:

In the course of study of the influence of various measures having benefit toward the rheumatoid syndrome, attention was directed to the application of external heat. It was observed, among other findings, by Pemberton, Hendrix and Crouter [13] that the percentage oxygen saturation of the peripheral blood tends to rise, as the result of the subjection of a person to an electric bake, applied in the usual therapeutic manner. This rise in the oxygen saturation is presumably due to the acceleration in the circulation that occurs, and is in keeping with the statement by Wells [16] that blood from a hyperemic area contains more oxygen and less carbon dioxid than normal blood.

These several observations suggest that in the arthritic patient there is a change in the circulatory conditions or rate such that the tissues do not extract from the blood as it passes through them the usual amount of available oxygen. In connection with the blood flow in arthritis it is to be noted that analysis of the beneficial effects of external heat, massage and exercise, on the rheumatic syndrome,[11] shows that the first and last of these measures produce opposite effects on the acid-base equilibrium of the blood, and that the favorable influences of all three measures are apparently due chiefly to their effect on the circulation.

ABSORPTION FROM THE GASTRO-INTESTINAL TRACT IN ARTHRITIS

It has been further observed by one of us [17] that in a considerable percentage of arthritic patients particularly of the so-called proliferative type, undoubted benefit may accrue from the application of a reduced caloric intake. This observation has been corroborated by Fletcher,[18] in two series of fifty and 100 cases, respectively, by Cecil and Archer [19] and by others. It seemed possible therefore, in view of the evidence suggesting an increased circulatory rate in arthritic patients, that in arthritis absorption from the intestinal tract and stomach might take place too rapidly and that the influence of a lowered dietary could be explained by avoidance of an abrupt or undue absorption. It seemed also possible, for the same reason, that the lowered glucose tolerance in arthritis might be referable to an unduly rapid absorption of glucose. It was therefore determined to test this by feeding urea and potassium iodid coincidentally with the glucose, in the conduction of a test for lowered sugar tolerance. If the difference between a normal and lowered sugar tolerance is largely a difference in the rate of absorption of sugar from the intestine, corresponding differences in the rise of nonprotein nitrogen in the blood and in the rate of excretion of nitrogen and iodid might be expected when urea and potassium iodid are given with the sugar. Urea and potassium iodid are diffusible substances, presumably readily absorbed from

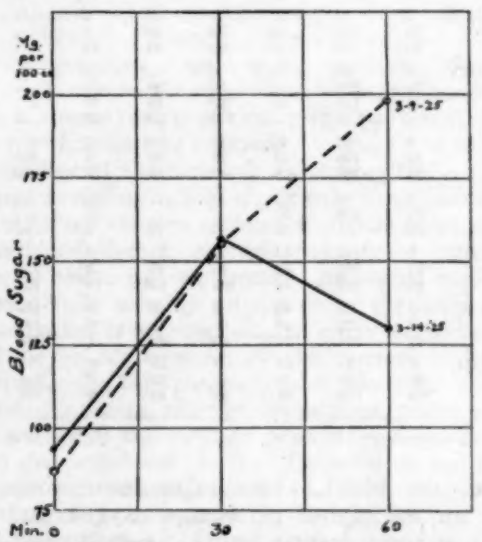

Chart 2 (Case 20).—Effect of postural interference with the circulation on sugar tolerance.

the intestinal tract. Mendel and Baumann [20] found that potassium iodid is absorbed from the mammalian stomach. In the present studies, nonprotein nitrogen of the blood and total urinary nitrogen were determined by Folin's methods.[21] Iodids were determined in the urine by oxidizing the iodid to iodin with nitrous acid, extracting the iodin with chloroform, and after washing the chloroform free of nitrous acid, titrating the iodin present with hundredth normal sodium thiosulphate.[22] The appended tables show, however, that the nonprotein nitrogen of the blood rose no higher in cases with a low sugar tolerance, and therefore a high concentration of sugar in the blood, than it did in cases showing a normal sugar tolerance, and therefore a low glucose concentration. Similarly, the excretion of iodin and total nitrogen in the urine showed no increase in the urine in thirty minute periods in the cases of low sugar tolerance as compared with the cases of normal tolerance. There is therefore no suggestion that an increased rate of absorption accounts for the variety of low sugar tolerance under discussion. These observations left the matter open to some other explanation. As an alternative,

14. Cullen, G. E., and Robinson, H. W.: J. Biol. Chem. **57**: 533 (Sept.) 1923.
15. Lundagaard, C.: J. Biol. Chem. **33**: 133 (Jan.) 1918. Goldschmidt, S., and Light, A. B.: Am. J. Physiol. **73**: 127 (July) 1925.
16. Wells, H. G.: Chemical Pathology, Ed. 4, Philadelphia, W. B. Saunders Company.
17. Pemberton, Ralph: Am. J. M. Sc. **161**: 517 (April) 1921.
18. Fletcher, A. A.: Dietetic Treatment of Chronic Arthritis and Its Relationship to Sugar Tolerance, Arch. Int. Med. **30**: 106 (July) 1922.
19. Cecil, R. L., and Archer, B. H.: Arthritis of the Menopause, J. A. M. A. **84**: 75 (Jan. 10) 1925.
20. Mendel, L. B., and Baumann, E. J.: J. Biol. Chem. **22**: 165 (Aug.) 1915.
21. Folin, Otto: Laboratory Manual of Biological Chemistry, Ed. 3, New York, D. Appleton & Co., 1922, pp. 59, 235.
22. Neuberg, C.: Der Harn, Berlin, Julius Springer **1**, 810, 1911.

it seemed possible that the mechanism producing a high percentage saturation of oxygen during the conduction of a test revealing a lowered sugar tolerance was referable, not to an increased rate of circulation, but, to a failure of the blood adequately to reach certain areas or tissues of the body. The effect of this would be, equally, to leave unutilized some of the available constituents of the blood. This explanation would also account for the higher percentage oxygen saturation observed in some fasting arthritic patients.

Table 1.—*Absorption from the Alimentary Tract in Arthritis Following Ingestion of Glucose, Urea and Potassium Iodid*

		Blood Analysis			Urine Analysis				
Subject	Date	Time, Minutes	Blood Sugar, Mg. 100 C.c.	Non-protein Nitrogen, Mg. 100 C.c.	Time, Minutes	Volume per ½ Hour, C.c.	Iodin per ½ Hour, Mg.	Total Nitrogen per ½ Hour, Mg.	Sugar, Gm.
1	12/ 9/24	0	80	28	35	..	16	...	0
		30	143	33	70	150	10	241	0
		60	164	39	140	10	13	96	0
2	12/15/24	0	90	26	25	25	0	...	0
		30	167	31	55	25	7	...	0
		75	139	32	..	..	..	...	...
		95	137	38	105	24	10	...	0
3*	12/18/24	0	81	23	30	20	0	...	0
		35	125	25	75	38	9	...	0
		65	102	32	130	33	13	...	0
4	1/14/25	0	85	28	0	..	0	...	0
		30	125	31	35	20	3	...	0
		75	110	36	90	55	10	...	0
					170	60	13	...	0
5	1/19/25	0	95	34	40	30	1	...	0
		30	176	40	90	30	8	285	0
		85	186	38	140	36	12	350	0
6	1/20/25	0	78	..	..	..	..	...	...
		30	128	33	..	..	..	...	...
		90	85	35	190	10	3	...	0
7	1/22/25	0	97	38	0	14	0	147	0
		30	139	42	45	12	2	134	0
		60	215	48	105	15	10	235	0
8	1/31/25	0	95	39	0	8	0	123	0
		40	179	40	45	23	2	194	0
		85	166	42	90	30	7	323	0
9	2/20/25	0	100	38	0	15	0	173	0
		30	129	39	40	25	2	236	0
		60	130	43	85	45	9	298	0

* Normal person.

THE INFLUENCE OF THE CIRCULATION ON THE SUGAR TOLERANCE IN ARTHRITIS [23]

It was therefore determined, as an experimentum crucis, to reduce the blood flow or interfere with it in some part or parts of the body in such a way as to simulate a condition in which, for example, a large capillary area is closed, and then to conduct a test of sugar tolerance in the usual manner. A positive result, showing the induction of a lowered tolerance, would be obviously confirmatory of the foregoing hypothesis. The method decided on was to place normal and arthritic persons, whose sugar tolerance had been determined as essentially normal, in the recumbent position with the legs and one arm elevated at right angles to the body, and then to carry out a test of sugar tolerance in the usual manner. In practice it was found useful for the subject to lie on a bed, the head or foot of which touched a wall, and to allow the elevated legs to rest against the wall for support, thus obviating any muscular or other effort. The elevated arm was supported by a pillow and by a loop of bandage, attached to a clothes tree, through which a finger could be hooked. This position was maintained throughout the experiment for an hour or an hour and a half. Shortly after raising the legs, evidences of inadequate circulation were apparent in the low surface temperature, quick collapsing pulse in the dorsalis pedis artery and, later, a gray cyanosis. In some cases cramps of the posterior tendons or muscles of the calf or thigh occurred. The blood under these circumstances doubtless reaches the periphery of the limbs concerned in a somewhat explosive manner, after the fashion of a Corrigan pulse, since the column within the vessels during diastole lacks its usual support or vis a tergo. By the same token, it would appear that the venous return is much expedited by gravity, the valves being designed to operate in the opposite direction, so that the tissues as a whole have a curtailed contact with the blood, and less opportunity for the respiratory and other interchanges.

Experiments were carried out on two normal persons and thirteen arthritic patients. The data show that in an important percentage of arthritic patients (60 per cent.) who have had from the outset, or have acquired, an essentially normal sugar tolerance, it is possible, by means of interfering with the blood flow in three limbs, to induce a lowered sugar tolerance comparable to that seen in 60 per cent. of arthritic patients at large. This low tolerance has been induced, so far, in the arthritic patients only and not in the normal subjects. This fact

Table 2.—*Effect of Circulatory Changes, Resulting from Elevation of the Limbs, on the Sugar Tolerance of Arthritic Patients* *

	Seated			Legs Elevated		
Subject	Date	Time, Minutes	Blood Sugar, Mg. per 100 C.c.	Date	Time, Minutes	Blood Sugar, Mg. per 100 C.c.
10	2/10/25	0	94	2/ 6/25	0	94
		35	154		30	155
		65	142		60	193
				2/18/25	0	88
					30	137
					60	169
11 †	4/10/24	0	99	2/12/25	0	88
		45	112		30	119
		90	109		60	104
12 †	.....	..	...	2/13/25	0	86
					35	111
					75	84
13	2/19/25	0	87	2/16/25	0	90
		30	135		30	131
		60	132		60	123
2	2/20/25	0	81	2/17/25	0	90
		30	157		30	169
		65	124		60	197
14	2/28/25	0	87	2/25/25	0	94
		30	162		35	164
		60	177		65	162
15	3/19/25	0	88	3/ 3/25	0	87
		30	137		30	122
		60	164		60	148
16	4/25/25	0	86	3/ 4/25	0	91
		35	148		30	144
		65	182		65	205
17	3/10/25	0	95	3/ 4/25	0	88
		30	108		35	133
		60	97		65	162
18	3/12/25	0	101	3/ 5/25	0	105
		30	149		30	161
		60	158		60	176
19	3/13/25	0	104	3/ 6/25	0	94
		55	168		50	156
		95	159		85	161
20	3/14/25	0	91	3/ 9/25	0	87
		30	156		30	155
		60	130		60	198
21	3/16/25	0	92	3/11/25	0	86
		33	150		30	152
		65	101		60	155
22	.....	..	...	2/24/25	0	87
					30	112
					60	89
23	.....	..	...	3/17/25	0	89
					30	121
					65	130

* This table will also appear in the Journal of Biological Chemistry.
† Normal person.

23. We are indebted to Dr. E. G. Peirce for cooperative assistance in several phases of this work.

may relate it to a possible exaggeration, by the position assumed, of a comparable, already existing state of affairs in the peripheral circulation, rather than merely to a disturbance of circulation created "de novo." A striking feature of the charts is the slant of the curves which show, in most instances, that not only was the blood sugar higher in the experimental position at the end of an hour but it was still mounting at a time when in the normal position it had already fallen.

TABLE 3.—*Effect of Elevation of the Limbs on Secretion of Urine*

		Sented						Legs Elevated					
Subject	Date, 1925	Sample*	Volume per Hr., C.c.	Specific Gravity	Sugar, p_H	Sugar, Gm.		Date, 1925	Sample*	Volume per Hr., C.c.	Specific Gravity	Sugar, p_H	Sugar, Gm.
10	....	...	...	.....	...	...		2/18	1	169	.....	6.4	0
									2	324	.....	6.6	0
13	2/19	1	70	.....	6.8	0		2/16	1	42	.....	6.0	0
		2	146	.....	7.0	0			2	275	.....	6.8	0
2	2/20	1	51	.....	6.8	0		2/17	1	40	.....	5.2	—
		2	88	.....	6.8	0			2	276	.....	6.6	0
								6/12†	1	35	1.023	6.4	—
									2	100	1.013	7.2	—
14	2/26	1	72	1.021	7.2	0		2/25	1	51	1.020	7.8	—
		2	25	1.026	6.0	0			2	224	1.010	7.2	0
15	3/19	1	55	1.015	5.4	0		3/ 3	1	99	1.006	6.4	0
		2	83	1.011	6.4	0			2	168	1.005	6.4	0
16	4/25	1	38	1.032	5.0	0		3/ 4	1	17	.....	5.0	0
		2	142	1.015	5.4	0.86			2	77	.....	6.0	1.05
17	3/10	1	35	1.029	5.2	0		3/ 4	1	22	1.022	5.0	0
		2	45	1.025	6.0	0			2	238	1.006	5.2	0
18	3/12	1	26	1.032	5.0	0		3/ 5	1	30	.....	5.2	0
		2	27	1.030	5.2	0			2	139	1.011	6.4	0
19	3/13	1	51	1.016	6.2	0		3/ 6	1	54	1.017	6.0	0
		2	178	1.007	6.6	0			2	345	1.006	6.6	0
20	3/14	1	33	1.025	5.4	0		3/ 9	1	35	1.021	5.0	0
		2	244	1.006	6.8	0			2	323	1.003	6.6	tr.
21	3/16	1	24	1.023	5.0	0		3/11	1	20	1.026	6.5	0
		2	33	1.024	5.2	0			2	136	1.010	7.4	0
								6/ 9†	1	7	.....	5.2	—
									2	20	.....	6.8	—
11‡	....	...	...	.....	...	...		2/12	1	34	.....	...	—
									2	56	.....	...	0
12‡	....	...	...	.....	...	...		2/13	1	58	.....	...	0
									2	167	.....	...	0
24	....	...	...	.....	...	...		6/ 1†	1	51	1.019	5.2	—
									2	216	1.006	6.8	—

* Sample 1 was obtained before the experiment; Sample 2, at the end of the experiment.
† No sugar taken.
‡ Normal person.

It will be noted by referring to Table 3 that a marked diuresis accompanied practically all cases in which the legs were elevated. A definite increase in alkalinity was observed to accompany the diuresis in most cases, in keeping with the experience of others who have studied urinary volume and p_H.[24] This diuresis suggests an influence on the kidneys, and it is not inconceivable that the suprarenals may be affected also in view of their close anatomic relation to the kidneys.

A comparable diuresis has been observed by Griffith and Hansell [25] as the result of extra-abdominal pressure.

The relation of these findings to carbohydrate metabolism has been discussed elsewhere.[1] Mention only will be made of the fact that observations on the blood sugar after assumption of the experimental posture, when uninfluenced by glucose feeding, show no increase in sugar. This indicates that the degree of "anemia" in the elevated limbs is not sufficient to cause asphyxia of the tissues and hence hyperglycemia from this cause. It also indicates that hyperemia of the suprarenals is not an operative factor, under fasting conditions, following the experimental position.

The evidence therefore strongly indicates that, whether or not any additional mechanism be concerned, denial to the muscular tissues of their usual degree of contact with the circulating blood interferes with the withdrawal of glucose, so that when sugar is fed, a lowered tolerance results.

That circulatory changes contribute therefore to the pathology of arthritis and constitute part of the effects of focal infection, with both of which a lowered sugar tolerance is so closely associated, is thus clearly suggested. If these observations be correlated with the clinical benefits known to follow measures which improve the blood flow in arthritis, this suggestion becomes even stronger.

SUMMARY

1. It has been shown that 60 per cent. of all arthritic patients present a lowered sugar tolerance and that this tolerance returns toward or to normal after recovery from arthritis, whatever the therapy employed. It does so most abruptly, however, after the removal of causative focal infection. As a corollary to this, the occurrence of an inflammatory process, such as sinusitis, may induce a lowered sugar tolerance in a previously healthy subject with a normal tolerance.

2. Studies of the blood gases, during the conduction of a test revealing a low sugar tolerance, showed that the percentage oxygen saturation of hemoglobin of the venous blood rises in a large majority of cases. The failure to relate this to chemical processes implies that the blood fails to reach all tissues of the body, or that the circulation is accelerated. In either event the result would be to leave some of the normal constituents unutilized. In this connection, it has been shown in a series of arthritic and normal persons, under identical conditions, that the average percentage oxygen saturation of the peripheral blood of the arthritic patients was higher in the ratio of 56 to 43. The range for the arthritic group was from 25 to 95; for the normal group from 27 to 67.

3. In a considerable proportion of arthritic patients, particularly of the "proliferative" type, the application of a restricted caloric diet is of benefit. In view of the suggestions, afforded above, of a possibly increased rate of circulation in arthritis, the hypothesis was advanced that absorption from the gastro-intestinal tract might in consequence be unduly rapid. The benefits of a reduced diet would then be referable to the avoidance of an undue, or unduly rapid, absorption, and the occurrence of a low sugar tolerance would be referable to too rapid absorption. This hypothesis was tested by feeding urea and potassium iodid, coincidentally with the sugar, to arthritic patients with normal and lowered sugar tolerance. The nonprotein nitrogen of the blood and the urinary iodid and nitrogen did not change commensurately with the blood sugar, however. The results gave no support to the theory of an increased rate of absorption in arthritis and left, as one alternative, the theory that the blood inadequately reached some tissues. This failure to reach all tissues might result from closed capillary beds, and would, equally, leave some of the blood constituents unutilized.

4. This hypothesis was therefore tested by interfering, through posture, with the blood flow in the limbs of arthritic and normal persons and then conducting a glucose tolerance test. The results showed that in half of the cases studied it was possible to induce a lowered sugar tolerance in subjects presenting otherwise a nor-

24. Henderson, L. J., and Palmer, W. W.: J. Biol. Chem. **22**: 305, 1914. Bazett, H. C.; Thurlow, S.; Crowell, C., and Stewart, W.: Am. J. Physiol. **70**: 430 (Oct.) 1924.
25. Griffith, J. O., and Hansell, H. R.: Am. J. Physiol. **74**: 16, 1925.

mal sugar tolerance. In view of the close relationship of a lowered tolerance to arthritis and focal infection, this evidence approaches proof that a disturbance of the circulation, probably in the nature of closed capillary areas, constitutes an important part of the pathology of arthritis and the rheumatoid syndrome. If these findings are correlated with the well recognized benefits acruing in arthritis from measures which improve the circulation, the evidence becomes stronger.

ACTION OF CARDIAC STIMULANTS IN CIRCULATORY FAILURE DUE TO DIPHTHERIA*

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An important group of drugs that is always in demand in cases of emergency is the class known as the cardiac stimulants. It is true that they form rather an indefinite group and include drugs that have no direct effect on either heart or blood vessels, their only possible influence on the circulation being an indirect one. Perhaps those which are mentioned most commonly in this connection as being useful in cases of circulatory failure in acute infections are strychnin, camphor, epinephrin, digitalis, pituitary preparations and caffein. In this group should probably be included also the various solutions that are used for intravenous injections, such as Ringer's solution, and acacia and glucose solutions. It is true that some of the drugs named have been to a greater or less extent discredited for this purpose, and not so much reliance is placed on them now as there was some years ago. To this group belong especially strychnin and camphor, which various researches have shown to be largely ineffective in cases of acute circulatory failure. The clinical value of the other four drugs is fairly well established, as are also the special indications for the use of the individual members of the group. But, it may be asked, is confidence in these drugs well placed? The value of any remedy in cases of acute circulatory failure in man is naturally very hard to estimate, and it is not at all impossible that the muscle of a heart which has undergone profound pathologic changes may react in a manner different from one that is normal.

The objection is sometimes made to pharmacology that it is a study of the effects of drugs on the tissues and organs of normal animals, and that it is impossible to transfer results so obtained to the conditions encountered in clinical practice in which the organs have been the subject of more or less extensive pathologic changes. It was for this reason that the research reported here was carried out, with an effort to duplicate as closely as possible in the laboratory, conditions encountered in the sickroom, with the difference, of course, that in certain circumstances more radical experimental procedures were carried out than would be allowable in the case of the human subject.

For the purpose of producing changes in the heart muscle, diphtheria toxin was employed, as it has been recognized for a long time that this toxin has a very powerful effect on all cells, including those of the heart muscle. In fact, it is doubtless true that failure of the heart is today the most common cause of death in diphtheria. It is not necessary to review the numerous researches that have been carried out to elucidate the changes which are produced in the heart by this toxin, as recently this was done very completely by Warthin,[1] who pointed out that the essential lesion of the heart in diphtheria is a toxic parenchymatous hyaline necrosis associated frequently with fatty degenerative infiltration or with cloudy swelling.

An interesting question regarding circulatory failure in diphtheria is whether it is cardiac or vascular in origin, and if vascular, whether the difficulty is central or peripheral. The early work of Rombert, Passler, Bruhns and Muller [2] pointed to a paralysis of the vasomotor center as primary, with a secondary failure of the heart. This view, however, is directly contradicted by the work of Porter and Pratt,[3] which showed that the activity of the vasomotor center is unimpaired in diphtheria. On the other hand, more recently, Yabe [4] has concluded that the low blood pressure was indeed due to failure of the vasomotor center.

There are the same contradictions as to the part that the heart plays in the production of the failure of the circulation. Beck and Slapa [5] considered that the heart was primarily at fault, as it was unable to raise the blood pressure when the abdominal aorta was compressed. Opposed to this view, however, is the work of MacCallum,[6] which showed that the actual work performed by a diphtheria poisoned heart was as great as that of a normal heart. In considering the last mentioned paper and its importance in the settlement of the question under discussion, it must be borne in mind that MacCallum injected massive doses of toxin intravenously into dogs and then carried out his experiment on the hearts of these animals only a few hours later. For instance, the efficiency of the heart of Dog 13, which was injected with 3 c.c. of toxin at 10:30, was tested at 4:45, while other hearts were tested in from ten to twelve hours. Doubtless, the results obtained by MacCallum are correct under the conditions described, but they can hardly be carried over to explain the circulatory failure in human diphtheria in which the absorption of the toxin is gradual, and days are allowed for pathologic changes in the heart to take place. As a matter of fact, MacCallum gives no information regarding the pathologic findings in the hearts with which he worked. The whole question of the effect of diphtheria toxin on the cardiovascular system has recently been discussed by Marvin,[7] who concludes that toxic myocarditis is present in a large proportion, possibly in all, of the patients who die of circulatory failure. He regards the evidence in favor of a primary failure of the peripheral circulation as not conclusive.

PRESENT INVESTIGATION

In our experiments, we tried to imitate the slow absorption seen in the clinical conditions by injecting the toxin subcutaneously in small divided doses, from

* From the Pharmacological Laboratory of the University of Michigan Medical School.
* Read before the Association of American Physicians, Washington, D. C., May 4, 1925.

1. Warthin, A. S.: J. Infect. Dis. **35**: 32 (July) 1924.
2. Rombert, Passler, Bruhns and Muller: Deutsch. Arch. f. klin. Med., 1899, p. 652.
3. Porter and Pratt: Am. J. Physiol. **33**: 431, 1914.
4. Yabe, S.: J. Pharmacol. & Exper. Therap. **19**: 1 (Feb.) 1922.
5. Beck and Slapa: Wien. klin. Wchnschr., 1895, p. 323.
6. MacCallum: Am. J. M. Sc. **147**: 37, 1914.
7. Marvin, H. M.: Effect of Diphtheria on Cardiovascular System: Heart in Faucial Diphtheria, Am. J. Dis. Child. **29**: 433 (April) 1925.

0.05 to 0.15 c.c. being injected every second or third day. Most of the dogs stood two or three injections, dying in from four to six days. They exhibited the signs of an acute illness, refusing food and lying quiet, and later becoming apathetic. Severe hemorrhages from the bowel and from the respiratory passages occurred late in the illness, and dogs showing these symptoms usually died in a few hours.

In order to avoid extensive operative manipulations, our experimental procedures in most cases were confined to blood pressure measurements. In a few animals heart records were taken, but dogs so toxic as these did not stand such operations well.

After the experiment was completed, a necropsy was performed, the heart was removed, together with pieces of other organs showing gross pathologic changes, and these were placed in solution of formaldehyd and turned over to Professor Warthin of the department of pathology of the university, who made the pathologic examinations of the material.

In order to give our results in as concise a form as possible, the dogs may be grouped into three classes, as within these groups the individual animals reacted practically alike.

In the first group may be included all those dogs which were severely ill. They lacked appetite and were weak, but they could stand and perhaps stagger about the room and would respond when spoken to. For these animals, an anesthetic was necessary in order to carry out the simple operative measures, and for this purpose ether was found to be most suitable To some dogs, we gave paraldehyd by mouth. This was not very successful, proving to be unusually toxic, as doses considerably below the usual anesthetic doses proved fatal in a very short time.

The dogs in Groups 2 and 3 were alike in being in imminent danger of death. They had passed through the stages described in Group 1, and had had, in most cases, one or more hemorrhages either from the bowel or from the respiratory passages, or from both. They were very weak and apathetic and in many cases were in a condition of complete coma. These animals could be operated on without any anesthetic, showing no sign of sensation except that in a few instances, when the trachea was being isolated, a slight change in respiration was noticed. Group 2 survived the operative procedures and served their purpose for some hours, while those in Group 3 died on the table while the cannulas were being inserted, and they therefore served for the investigation of these drugs which are used only in conditions of the greatest circulatory emergency.

Before giving the pharmacologic results, it may be well to give the pathologic findings, as in all the hearts the changes were much alike, differing mainly in degree. Macroscopically, the hearts were all pale and flabby. In a certain number, small hemorrhages were scattered over the wall externally, especially in the neighborhood of the septum. When cut open, the majority of the hearts showed more or less extensive subendocardial hemorrhages. In many, the left ventricle was almost completely lined by the hemorrhagic areas, while the right ventricle was always less affected. The microscopic changes, as reported by Professor Warthin, consisted of a greater or less degree of Zenker's necrosis with fatty degenerative infiltration, congestion and petechial hemorrhages. In some hearts, the muscle appeared as if cooked. A marked congestion and hemorrhagic condition of the intestinal mucosa was present also in most of the dogs.

Considering now the pharmacologic findings, those dogs which died on the table and which are included in the third group may be considered first. Briefly, it may be said that all therapeutic measures were without avail. As the animals were in such a desperate condition, heroic measures were permissible. The intravenous injection of epinephrin proving ineffective, it was injected through the chest wall into the heart, but this too failed in every case although the chest wall was rhythmically vigorously compressed at the same time. Since in several dogs these measures had proved of no avail, in others in which the heart stopped the thorax was rapidly opened while artificial respiration was being carried on, and epinephrin was injected into the heart in 1 or 2 c.c. doses. Even though in addition the heart was massaged, the only response in such cases was a series of peristaltic waves which passed over the heart and which were followed by ventricular fibrillation.

In one animal after at least fifteen minutes of manipulation, the heart started to beat, but it was slow and weak and stopped entirely in ten minutes. In most of the hearts, the ventricles were in a much worse condition than the auricles, as often the auricles would be found beating with a fair degree of strength and regularity, while all efforts to restore the beat of the ventricles were futile.

Less radical measures than these described were entirely without avail. Those employed were the intravenous injection of digitalis, camphor, physiologic sodium chlorid solution, and solutions of acacia and of glucose, but all failed.

The pharmacologic results with this group of dogs are in striking contrast to those obtained with hearts of normal dogs in which the injection of epinephrin even minutes after the heart had stopped, especially when it is given into the heart and accompanied by cardiac massage, is followed by complete recovery.

The dogs in Group 1, which comprised those which were just able to stagger around and which required an anesthetic, were alike in showing marked signs of circulatory failure. In every case the blood pressure was much below the normal, usually being between 40 and 60 mm. of mercury. The pathologic report showed that all of these hearts were badly diseased, but in spite of that the pharmacologic reaction in every case was practically normal.

For example, Dog 7, the heart of which showed marked Zenker's necrosis, congestion, hemorrhages and fatty degenerative infiltration, sustained an increase in blood pressure from 70 mm. to 100 mm. as the result of the administration of 2 c.c. of the tincture of digitalis. A further injection of 2 c.c. raised the pressure to 140 mm. In another dog with a heart showing approximately the same changes as those described above, a similar dose of digitalis raised the pressure from 26 mm. to 60 mm. The results from ouabain, as would be expected, were much the same as those described for digitalis, in one dog raising the pressure from 26 mm. to 34 mm. and in another raising it from 54 mm. to 160 mm. Pituitary preparations also were followed by a good response, in one dog raising the pressure from 50 mm. to 140 mm., the pressure being well sustained. Neither camphor, strychnin nor caffein had any marked effect on the circulation as far as could be seen by blood pressure measurements. The evidences of central nervous stimulations were plainly visible.

The results obtained on this group of dogs showed that even if the hearts were very badly diseased and showed necrosis, congestion, fatty infiltration and hemorrhages, they yet reacted satisfactorily to epinephrin, the digitalis series and the pituitary preparations; that is, to the drugs which would ordinarily be employed in clinical medicine in cases of impending failure of the circulation.

The intermediate group of animals furnished some interesting results. These animals had a blood pressure of about 5 or 10 mm. of mercury and were in imminent danger of death. It was very noticeable during the operation necessitated by the insertion of the cannulas that the tissues were very dry and that the vessels were comparatively empty. Even the carotid contained so little blood at times that, to judge by the color alone, it would have been impossible to distinguish it from the vagus. On account of this apparent lack of circulating fluid, we directed our attention to supplying this want by using warm (45 C.) Ringer's solution, 6 per cent. acacia solution and finally 10 per cent. glucose solution.

The results from the saline solution were very unsatisfactory. If the solution was run into a vein from a buret, the effect of the increased fluid on the pressure was practically nil. In some experiments it was thrown into the circulation rapidly by means of a large syringe, and in these cases the pressure was raised very considerably; but as soon as the injection was stopped the pressure fell as rapidly as it had risen. No permanent or sustained increase was obtained.

With the 6 per cent. acacia solution, the results were slightly different but scarcely more favorable. In one dog which had suffered from severe hemorrhages, 100 c.c. of acacia solution was given but even during the infusion the blood pressure decreased, falling from 30 mm. to 26 mm. of mercury.

In another dog which was comatose and in bad condition as the result of marked hemorrhages, 50 c.c. of the acacia solution had little effect, raising the pressure merely from 12 mm. to 16 mm. Possibly a further experience with acacia, perhaps under different conditions, might modify our views; but in general our experience in these experiments with it has been distinctly disappointing.

With glucose, however, the results were very favorable. From experience, we found that if we could only get glucose solution (10 per cent.) into the circulation before the heart stopped, no matter in how bad a condition the dog was at the time, we could invariably save the animal for further experimental work. If the solution heated to about 45 C. was allowed to run into a vein, the effects were seen after about 25 c.c. was introduced. The great change was in the increasing strength of the heart, the pulse waves becoming stronger and stronger until they compared favorably with those produced by a normal heart. In some animals, the general blood pressure was not increased greatly, but in others this effect too was quite satisfactory. The favorable effect of the glucose, for instance, was seen in Dog 20, in which 200 c.c. of 10 per cent. glucose raised the pressure from 16 mm. to 28 mm., greatly strengthening the heart. In Dog 21, which was in as bad a condition as any animal we succeeded in saving, 175 c.c. of the glucose solution raised the pressure from 10 mm. to 50 mm. The pressure was well sustained and the heart greatly strengthened. Following the use of digitalis, 100 c.c. more of the solution raised the pressure again from 70 mm. to 84 mm.

The beneficial results from the use of glucose are probably largely to be explained by its nutritive value. A 10 per cent. solution, of course, is hypertonic and would tend to draw fluid from the tissues and thus further add to the volume of the blood; but as the results are so superior to those obtained from the use of acacia, it would probably be true that its main value is due to the fact that, in addition to the solution adding bulk to the blood, it also serves as a source of energy to the heart.

The effect of the other drugs used on these dying dogs was in general characteristic of the drugs employed. Epinephrin brought forth a good response, especially if the rise was expressed on the percentage basis. The actual increase, when expressed in millimeters, was often not great and quantitatively was considerably below normal. For example, Dog 4, with a heart showing extensive Zenker's necrosis, leukocytic infiltration and large hemorrhages under the endocardium, had a blood pressure of 10 mm., which was raised to 55 mm. by 3 minims (0.18 c.c.) of a 1:1,000 epinephrin solution. Dog 10, in much the same condition as Dog 4, was given a like dose of epinephrin, which raised the pressure from 10 mm. to 36 mm. Dog 14 was in bad condition and near death. Its blood pressure of 20 mm. was raised by 2 minims (0.12 c.c.) of epinephrin solution to 120 mm. The heart showed microscopically only slight necrosis and slight fatty degenerative changes. The heart of Dog 11 had stopped earlier, but under massage it started again with a slow but fairly regular beat. At this time, with a blood pressure of 5 mm., epinephrin even in a dose of 1 c.c. of the solution had no effect. Later, after a saline infusion, a second dose of epinephrin was given, this time 1 c.c. being injected into the heart; but, while the percentage increase was fairly satisfactory, the actual increase in millimeters was trivial, being from 6 mm. to 20 mm. In general, then, the results obtained with epinephrin, when it was given to a dog even in imminent danger of death and with a heart badly diseased but still beating, were satisfactory. On the other hand, if the heart had stopped and through massage and other procedures it had been started again, the results of epinephrin administration were not good.

The effect of digitalis administration was much the same as epinephrin. If the pressure was at a very low point (5 or 10 mm.) and the dog practically moribund, then digitalis had little or no effect. If the pressure was higher (from 20 to 30 mm.), then digitalis in 2 or 3 c.c. doses of the tincture raised the pressure about 50 per cent. For example, Dog 14, with a pressure of 20 mm., was given 2 c.c. of the tincture, and the pressure rose to 30 mm. A second 2 c.c. raised it to 45 mm., and a third dose raised it to 65 mm.

If, on the other hand, to some of these dogs which were practically moribund glucose was given first to supply fluid and nourishment, then digitalis gave much better results. Dog 21 was comatose with a pressure of 10 mm. Glucose and acacia raised the pressure to 54 mm., and 3 c.c. of digitalis tincture raised it to 70 mm., certainly a satisfactory response for a dog dying from diphtheria with chronic endocarditis, Zenker's necrosis, fatty degenerative infiltration and numerous hemorrhages into the heart muscle.

The other drug, the administration of which was followed by good results, was pituitary extract. While this was not used primarily in any case in which the animal was in a dying condition, but rather after other

measures had first been used, yet the reaction following its use was always quite satisfactory. In Dog 15, a blood pressure of 50 mm. was raised to 140 mm. by a pituitary preparation, the pressure being well sustained. Dog 20, comatose and with no anesthetic and an original blood pressure of 12 mm., sustained an increase in pressure from 30 mm. to 70 mm. following pituitary administration. Dog 21, also comatose, with an original pressure of 10 mm., had its pressure raised by pituitary from 40 mm. to 100 mm.

This excellent showing may perhaps be explained partially by the fact that the increase in pressure is not due to an action of pituitary extract on the heart, but is of peripheral origin and the arterioles are evidently capable of contracting vigorously. The results, even when these facts are taken into consideration, show plainly that under certain conditions these diseased hearts are still capable of maintaining a very satisfactory pressure.

An interesting fact observed during the course of the experiments was that the hearts of these dogs were much more susceptible to digitalis than are the hearts of normal dogs. In these animals, doses of 2 c.c. were sufficient to produce good results and in some of the animals this dose caused distinct toxic symptoms, such as very marked vagus slowing. In some, the heart showed marked irregularity following the injection of a total of 4 c.c., and death followed a total of 6 or 8 c.c. This peculiar susceptibility to digitalis was shown by all the animals in which it was used successfully. The light anesthesia employed, or its complete absence, doubtless would furnish a partial explanation for the marked response from the vagus center, but in addition to the vagus effect, it appears as if the diseased condition of the heart muscle must render it more susceptible to the digitalis glucosids.

CONCLUSIONS

The results of these experiments would seem to show the importance of the early treatment of the circulatory failure that occurs in diphtheria. The earlier the remedial measures are instituted, the better the results are likely to be. However, even late in the course of the circulatory collapse, the so-called cardiac stimulants still produce their normal pharmacologic response. Only after the diphtheritic heart had actually stopped did they fail to bring about beneficial results.

If the circulatory failure has not extended too far, digitalis and pituitary preparations act well, while if the circulatory collapse has become extreme, an intravenous injection of warm 10 per cent. glucose solution given before any drugs are used is likely to be followed by favorable results. In many cases, the glucose was practically life saving. In our experiments, if we could get the solution into the veins before the heart stopped, we were certain to save the life of the dog. These dogs would then live for hours and serve for the investigation of the effects of the various drugs used in similar conditions.

From the pharmacologic standpoint, the time element seemed to be the most important factor in determining the success of the measures used. The earlier treatment was instituted, the greater was the prospect of success. In expressing this view it must of course be understood that we do not ignore or belittle the effect of the pathologic changes in the heart on the action of the drugs. However, it was impossible to appraise exactly the extent of the influence of these changes, as some of the hearts which showed the most marked necrosis and fatty change were resuscitated, while others not so greatly affected ceased to beat and could not be revived.

SPECIMEN PROTOCOL—ABBREVIATED

Dog 21.

4/5/25: 0.1 c.c. diphtheria toxin subcutaneously.
4/7/25: 0.1 c.c. diphtheria toxin subcutaneously.
4/8/25: Dog quiet but responds when spoken to.
4/9/25: 9:00 a. m., quiet.
11:00 a. m., weak, but responds.
1:30 p. m., comatose; no response to call or to being handled. No anesthetic necessary for insertion of cannulas. Animal in worse condition than any which have been previously used. Animal straightened out as though dying and ceased to breathe. Artificial respiration started, but dog started breathing again. Carotid artery practically empty. Mercury manometer showed feeble pulse with a pressure of 10 mm.
2:09, B. P., 10 mm.; 175 c.c. 10 per cent. glucose solution, 45 C., intravenously.
2:18, B. P., 50 mm.; heart much stronger.
2:18-2:30, 100 c.c. 6 per cent. acacia, 45 C. B. P. not changed.
2:31, 4 mm. 1:1,000 epinephrin solution. B. P. raised from 50 mm. to 110 mm.
2:37, pituitary extract, small dose. B. P. raised from 50 mm. to 100 mm. and well sustained.
2:45, B. P., 60 mm.; 3 c.c. tincture digitalis. B. P. raised to 75 mm. Heart became very irregular. Vomiting of blood.
2:48-2:56, 200 c.c. glucose solution raised B. P. to 90 mm.
3:00, 1 mg. strychnin, no apparent effect.
3:15, pituitary raised B. P. 70 mm. Eye reflex good. Heart still irregular.
3:30, heart had become slower and finally stopped.

The heart showed a few hemorrhages under the pericardium and also a few in the right ventricle under the endocardium. The cavity of the left ventricle was almost completely surrounded by hemorrhages under the endocardium. There were hemorrhages over the surface of the stomach, and the intestine was full of fluid blood. The microscopic findings reported by Professor Warthin consisted of an old chronic endocarditis, some atrophy of the heart muscle, moderate Zenker's necrosis, fatty degenerative infiltration in the papillary muscles, and numerous hemorrhages under the endocardium and the epicardium.

COMMENT

This protocol, which is typical of others, illustrates the general course of the action of the diphtheria toxin in dogs. It shows also that, even with a severely poisoned heart and almost complete circulatory collapse, glucose will bring about a very satisfactory increase in blood pressure and that epinephrin, digitalis and pituitary also are very efficient. Digitalis proves to be quite toxic, while a relatively large dose of epinephrin does not produce a very great increase in blood pressure. Acacia and strychnin apparently are without effect.

Thoracoplasty and Pneumothorax.—The results of a good thoracoplasty in properly selected cases show approximately the same percentage of recovery as a satisfactory pneumothorax, or about 40 per cent. clinical recoveries, 30 per cent. improvement and 30 per cent. early and late deaths. Some thoracoplastic surgeons, as Sauerbruch, have gone so far as to consider a thoracoplasty a more valuable operation than a pneumothorax. It is true that a thoracoplastic collapse has an advantage over a pneumothorax in that it is unchanging, whereas in a pneumothorax the degree of collapse or compression changes with gas introduction and absorption, or as a result of an obliterative pneumothorax the lung expands in spite of efforts to keep it collapsed.—Matson, Matson and Bisaillon.

OSTEOMYELITIS OF THE MANDIBLE *

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The presentation of this paper is made with the thought of possibly aiding in a better understanding of osteomyelitis of the mandible through a full discussion by members of this section. The disease is one that should interest not only the surgeon, but also the physician and dentist. All three practitioners have opportunity to observe and study this destructive and not infrequently fatal disease. The family physician and the family dentist are, by virtue of their intimate relationship to the patient, in a position to recognize symptoms of osteomyelitis developing in the mandible, and can frequently institute efficient treatment for its arrest. Yet, how often is the disease permitted to establish itself before adequate measures are taken to bring about its control. General diseases, such as scarlet fever or measles, may so interfere with the nourishment of the jaw as to permit the entrance of pus-producing organisms. Tuberculosis and syphilis may play their part in predisposing to the disease. Certain manufacturing pursuits may cause the disease, either by direct action, or by so lowering tissue resistance as to permit pyogenic bacteria to gain an entrance. Phosphorus necrosis has been eliminated to a great extent since legislation and improved hygienic measures in the industries have been instituted. Neglected or inadequately treated dental infections are by far the most common causes of this disease. Failure to establish early and adequate drainage in cases of acute alveolar abscess, or the application of external heat in the form of hot water bottles, electric pads, or poultices, in these cases, is a frequent cause of peridental infection spreading throughout the mandible, and at times into the soft tissues. Why patients suffering from acute dental infections should have their faces smeared with applications of ichthyol and poultices is beyond my comprehension.

Let us consider, for a moment, the structure of a child's mandible during the years of dentition. The partly formed permanent teeth are lying within their individual crypts, which in turn are within the body of the mandible, adjacent to one another, and in close approximation to the roots of the teeth already erupted. Infection of an erupted tooth can readily pass through the root end, or by means of the peridental membrane into the body of the mandible, and enter the crypts just mentioned. Spreading, from one crypt to another, and on throughout the cancellated structure is not difficult, and soon the entire half of the mandible is involved.

In the young child, an abscessed deciduous tooth should be extracted immediately. Acute infections of permanent teeth, in my opinion, should receive like treatment. It is seldom, if ever, that a tooth in the acute stage of abscess cannot be extracted with safety. While it is true that extraction of the offending tooth does not always arrest infection, and other means have to be instituted to establish proper drainage, the chances are that the patient would be worse off with the abscessed tooth still in position than without it.

Nearly every case of osteomyelitis coming under my care or observation has given a definite history of external heat having been applied when the face or jaw became swollen. Frequently, in cases which we have received early and in which extraction of the abscessed tooth has been done, followed by the application of ice to the mandible, the progress of the disease has nearly always been arrested. When pus is confined in or about the jaws, and external excision has not been made, the use of external heat or poultices is, to my mind, a dangerous practice. The use of external heat tends too frequently to draw infection into regions not desired.

Carrying of infection into deep structures by means of injections made for the purpose of producing anesthesia has been observed rather frequently. The mandibular injection, while a most valuable method of anesthetization where indicated, may be the means of depositing infection in or about the mandibular sulcus. Several cases of this nature have been observed. Evidently, osteomyelitis was secondary to infection placed at the mandibular sulcus, and had traveled into the body of the mandible by means of the canal.

Peritonsillar abscesses are not uncommon where the hypodermic needle has passed through swollen and infected retromolar tissues.

Within the last few years I believe there has been entirely too much unnecessary dental surgery done, where ordinary skilful extraction of teeth would suffice. Teeth extracted for the purpose of relieving pain or foci do not necessarily require curettement of the sockets. The term curettement as applied to the surgical removal of periapical granuloma does not seem to be the most descriptive: enucleation of the periapical sac is more appropriate, I believe. The majority of periapically infected teeth do not require anything further than clean extraction. When the periapical area is large, and simple extraction of the tooth is thought insufficient as a means of eradication, a flap of gum tissue turned back and the granuloma or cyst enucleated, after it has been thoroughly exposed to view, is good practice. But to attempt curettement through the socket of the extracted tooth appears to me not only questionable but totally inadequate. The apical contents, by such a procedure, are usually thoroughly macerated with the normal blood clot and remain in the socket, thereby creating an excellent culture tube. Cases of an alarming nature are constantly occurring following this form of treatment. The bone curet in the hands of an unskilled operator is a dangerous instrument, especially so when that operator feels called on to curet all sockets after extraction, whether the case is an acute alveolar abscess or not. Many cases of osteomyelitis are the result of this form of treatment. It is a wise man who knows when he has done enough.

So much for the osteomyelitis occurring from neglected or improperly treated dental cases. One must not overlook, however, the possibility of this disease manifesting itself through other channels, such as infection entering the blood by way of the tonsils, or through the respiratory or the genito-urinary mucous membranes. In some of these cases, chilling of the body or a strain or contusion of the part may precede the outbreak of symptoms.

The early recognition of this disease is most important. Too much reliance on the absence of roentgenographic findings in the early stages of the disease is to be avoided. One must be guided by the clinical findings, and establish drainage of the affected area, either by extraction of an abscessed tooth or, when necessary, of the cancellated structure itself. Every attempt should be made to conserve the contour of the mandible wherever possible. In early cases of the disease, intra-oral drainage will frequently accomplish the desired result.

* Read before the Section on Stomatology at the Seventy-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., May, 1925.

When the bone presents on exposure a "battleship gray" or "black grayish" appearance, and the patient is markedly toxic, I believe resection of the part most advisable. By obtaining the aid of an orthodontist, deformity of the jaw can be avoided to a great extent. Every attempt, of course, is made to preserve the periosteum, and return it to its natural position as nearly as possible. In the more chronic forms of the disease, the roentgenogram is an aid in determining when sequestration has occurred, and one can be governed thereby as to operating.

ABSTRACT OF DISCUSSION

DR. ROBERT H. IVY, Philadelphia: Development of osteomyelitis of the jaws is often dependent on lack of cooperation, procrastination, or misdirected treatment on the part of the family physician and the dentist. Often, in children, too litte importance is attached to proper conservation of the deciduous teeth and of the first permanent molars. The dentist is often placed in a quandary in facing these cases. If he extracts the tooth and osteomyelitis develops, he is liable to be blamed for the trouble; if he does not extract the tooth and the process continues, the blame is likewise liable to fall on him. While, as a general rule, it may be said that the abscessed tooth should be extracted, there is in the individual case an opportunity for the exercise of judgment as to just when to remove it. I am not prepared to accept the dogmatic statement that acutely abscessed teeth should be extracted immediately in all cases. The principal point is to establish drainage early by an incision through the periosteum, either in the mouth, if possible, or, if the drainage can be better accomplished, by external incision. If the case is in the fulminating stage, before frank suppuration has started, extraction of the tooth may do harm in spreading the infection. If, however, pus is seen welling up around the tooth, or if there is a distinct collection beneath the surface, drainage may be greatly aided by extraction of the tooth. After the acute stage is over and it is evident that a certain amount of necrosis is going to occur, waiting for the natural separation of sequestrums brings by far better end-results than radical removal of the diseased bone. By attending to proper drainage and cleansing by irrigation and by removing sequestrums as they form, it is possible to have the lost bone almost completely replaced by new bone, with avoidance of great deformity and interference with function. On the other hand, if the diseased bone is resected before complete sequestration, there is generally great interference with regeneration, resulting in unsightly distortion of the face, malocclusion of the teeth, or nonunion of the remaining portions of the bone.

DR. M. I. SCHAMBERG, New York: The paper is an absolute conviction of the methods that have been in vogue for many years by practitioners both in dentistry and in medicine when heat or poulticing has been suggested for the relief of pains about the face during the incipient stages of infection. Very often, when a patient suffers from a suppurative condition in other portions of the body, the possibility of bringing the infection to the surface by means of poulticing is warranted; but in and about the jaws the possibility of spreading infection is so apparent and clinically so often found to be highly destructive, that this paper will bear the message that it is an exceedingly dangerous practice. I was glad, also, to hear Dr. Ivy's discussion on the advisability of extraction in acute infections about the mouth, for there is at times a need for proper discrimination. Certain cases only are benefited by the removal of the tooth, even in the acute stage. At the same time an incision is made down to and through the periosteum, when there has been any evidence of thickening, so as to create a vent for the drainage of any collection of pus that may take place at that point. I have frequently seen cases in which the removal of the tooth has been like stirring up a hornets' nest, permitting the infection to spread; but if these cases are surgically watched and treated that may be avoided. I take some slight exception to Dr. Cameron's remarks on the curettement of the infected area. I believe that every extraction in an infection of the mouth is a surgical case. No one would leave a bone wound in any other portion of the body exposed to the filth that is ordinarily found within the mouth, and under no circumstances do I believe in having any case treated without some type of surgical treatment when there has been infection about the mouth or teeth. I agree that there should not be a blind curettement or churning or stirring up of infection. The granulomatous mass should be enucleated and the wound should be protected, not necessarily drained, if there is no free pus there to drain. It should not be drained of pus that does not exist, but it should be dressed and protected against the invasion of organisms, because they travel very quickly through the cancellous structure of the bone.

DR. E. G. RAMSDELL, New York: I wish Dr. Cameron would say a word about the management of cases of chronic osteomyelitis. I am thinking of two patients, one a girl of 18 who has had a cavity in the mandible for eight years. Her acute infection occurred eight years ago. It was taken care of at the time, and, five years ago, while in Europe she was operated on with an external incision, and the cavity was again drained and curetted. One year ago she had an operation from within the mouth. At present, a cavity about the size of a ten-cent piece is still in the mandible, with a dense wall of protective bone about it. Once in four or five weeks her jaw swells, and she has a good deal of pain. The swelling seems to subside spontaneously with a slight discharge from some small sinus on the inside of her mouth. The other case is that of a woman with a history of a similar process of fifteen years' duration.

DR. DOUGLAS PARKER, New York: I should like to reiterate what Dr. Schamberg said in regard to curettage. I believe that the curet is a very dangerous instrument in the hands of the uninitiated in cases of acute infection in the dental area. We can accomplish a great deal more by the use of firm packing, which will cause a sloughing off of the diseased tissue. I do not think that enucleation of a so-called granuloma is possible without spreading the infection in the acute cases. In the chronic cases curettage is valuable and should be utilized, but we must differentiate between acute cases and chronic cases. I would take exception to the "battleship gray" appearance of the bone, which Dr. Cameron mentioned. He spoke of the resection of the mandible. Too much surgery in these cases of acute osteomyelitis is uncalled for. Thorough opening up of the soft tissues, whether this is done within the mouth or externally, is sufficient. We should allow the bone that has lost its circulation to be thrown off naturally, rather than to resect the mandible radically.

DR. JAMES R. CAMERON, Philadelphia: As near as I can gather from the statement of the facts in the chronic osteomyelitis case, some place in that mandible there is a pocket of infection that has not been cleaned out or drained long enough. If the roentgen ray does not show such a pocket, in a case that has been active for eight years, it is justifiable to open the mandible wide in that region and to keep it opened and thoroughly drained. I can illustrate what I have in mind by referring to a case in which I saw a general surgeon operate, an osteomyelitis of the tibia. This patient had been operated on in four different hospitals in Philadelphia for subperiosteal abscess. He was admitted to the Pennsylvania Hospital with that diagnosis for the fifth time. I saw Dr. Gibbon evacuate the pus from beneath the periosteum. The bone was healthy looking, the surface being apparently normal. The roentgenogram revealed nothing abnormal. Dr. Gibbon said: "A subperiosteal abscess is always secondary to something else; there is something causing it. This man has been in the hands of four good surgeons in Philadelphia, and he still has this trouble. I feel that I am justified in opening up this apparently good bone to see what I find." He did open it, and after a tedious exploration, he found a well of granulation tissue in the upper part leading down to a small opening where the subperiosteal abscess had occurred. Dr. Parker mentioned the "battleship gray" appearance of bone. Probably I did not make myself clear regarding that. The point that I tried to bring out was that in cases in which the bone is opened up and one finds that grayish-black appearance, saturated with pus, plus pathologic fractures, and the bone a definite sequestrum, one is justified in lifting it out. If it is left alone, it has been my experience that the patient becomes worse. In cases

in which we have lifted that bone out, we have established good drainage, preserved the periosteum, regeneration has taken place, and the patient has recovered much sooner than if we had tried to retain the dead bone as a splint. I certainly would not use hot applications to the face swollen after extraction. I would try applications of ice, and if that does not give relief, after a short time one will find a definite area of fluctuation, and if that is incised and drained, relief will result.

DRAINAGE OF THE PAROTID GLAND

AN OPERATION IN CASE OF INJURY TO STENSON'S DUCT

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There are two ways in which obstruction commonly occurs to the flow into the buccal cavity from the parotid gland. The first is the growth, in the lumen of Stenson's duct, of a small stone that forms occasionally and lodges, more or less completely inhibiting the egress of parotid secretion. The second is the traumatic severing or inflammatory occlusion of the duct through which the saliva passes, keeping the secretion from finding an exit. The result in either case is the same. The parotid gland may be swollen to twice or three times its normal size by the accumulation of saliva, the secretion continuing to form and stretching the gland.

The method of cure is to reestablish the flow from the parotid into the mouth. In the case of a stone, it can generally be removed with no harm either to the duct or to the gland, and the flow immediately starts again. If the duct is cut, healing occurs with scar tissue formation, making a complete obstruction. A complete occlusion may take place from an inflammatory process, and the problem then is to provide a new canal or rebuild the old one. If a probe is placed in the canal and an opening made, it will close again in a short time. A canal must be formed, lined with mucosa, that will adequately drain and not contract shut in a short time with fibrous tissue.

I have used the following method of making a permanent canal in two cases with perfect results:

The internal opening is found, if possible, and a small incision made along Stenson's duct well into the gland. A very thin strip of lead, three-eighths inch wide and 2 inches long, is twisted with about three turns to the inch. This lead has a small hole in one end, through which a linen suture is passed and tied in the middle. The incision made along the duct is extended well into the gland, and one end of the lead strip is passed into it. A needle on each end of the linen suture is passed through the gland, out through the skin and out the cheek, the needles being about an eighth of an inch from each other. The ends of the suture are tied together, holding the lead in place. The saliva immediately begins to drain, and mucosa grows along the sinus to form a permanent fistula. The turns in the lead are sufficient to allow the saliva to flow easily and make the shape of the sinus. The lead is left in situ for four weeks, and then the suture is cut on the cheek and the strip removed. While the lead is in place, the inner end is flattened out against the mucous membrane and is not uncomfortable to the patient.

In these two cases, the results have been so good that I consider this method worth while reporting.

SODIUM THIOSULPHATE IN TREATMENT OF METALLIC INTOXICATION

REPORT OF CASES *

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The favorable influence of sodium thiosulphate on the toxic effects produced by the administration of arsenical, mercurial or lead compounds has been definitely shown by Ravaut,[1] McBride and Dennie,[2] Hoffmann and Schreus [3] and others.[4] Their reports deal especially with the after-effects of the arsphenamins in regard to arsenical rash, dermatitis, jaundice and intoxications. Clinical and pathologic findings demonstrate that intoxication with arsenic, mercury, lead and other metallic compounds produces irritation of the skin, liver and kidneys. If this irritation continues over a long period of time, degenerative changes will result. The fact that the skin is usually first affected in postarsphenamin reactions, and secondarily the liver or kidneys, may be due to a disturbed physiologic action of the skin. The function of the skin and its relationship to the autonomic nervous system has been discussed in the interesting studies by Mueller.[5] The different stages from mild to very marked idiosyncrasy displayed against these metallic poisons after external, oral or intravenous application can be explained, according to Mueller, by the disturbed balance of the autonomic nervous system of certain individuals. In every toxic reaction after the application of the foregoing metals they can be found in the blood, in the excretions of the kidneys or feces and, in the case of arsenic at least, in the skin (scales) also. If the toxic influences are of short duration, the skin shows clinical symptoms ranging from a mild rash or erythema to a severe dermatitis exfoliativa. These cases generally have a favorable prognosis, although in severe dermatitis exfoliativa the mortality is 20 per cent. Therefore, to avoid pathologic degenerations of the tissues, therapy should be instituted early. The best treatment known at present is the intravenous administration of sodium thiosulphate, by means of which the toxic action of the circulating or deposited metallic substances may be antagonized.

* From the Department of Pharmacology and the Wisconsin Psychiatric Institute.

* The cases reported were in the Wisconsin General Hospital, University of Wisconsin.

1. Ravaut, P.: Sodium Thiosulphate in the Treatment of Arsenical Dermatitis, Presse méd. **28**: 73 (Jan. 28) 1920.

2. McBride, W. L., and Dennie, C. C.: Treatment of Arsphenamin Dermatitis and Certain Other Metallic Poisons, Arch. Dermat. & Syph. **7**: 63 (Jan.) 1923. Dennie, C. C., and McBride, W. L.: Treatment of Arsphenamin Dermatitis, Mercurial Poisoning, and Lead Intoxication, J. A. M. A. **83**: 2082 (Dec. 27) 1924.

3. Hoffmann, E., and Schreus, H. T.: Sodium Thiosulphate as a Remedial Agent for Salvarsan and Mercurial Dermatitis, München. med. Wchnschr. **70**: 1481 (Dec. 14) 1923.

4. Semon, H. C.: An Antidote for Arsenic, Bismuth and Mercury Poisoning, Brit. M. J. **1**: 662 (April 12) 1924. Halliday, Hilda M., and Sutherland, C. E.: Ibid. **1**: 407 (Feb. 28) 1925. Fuss, S., and Dahlman, F.: Sodium Thiosulphate Treatment of Arsphenamin Dermatitis, München. med. Wchnschr. **72**: 345 (Feb. 27) 1925.

5. Mueller, E. F.: Leukozytensturz infolge unspezifischer Intrakutanimpfung, München med. Wchnschr. **69**: 1506 (Oct. 27) 1922; Die Bedeutung der Haut für die Insulinwirkung, ibid. **71**: 813 (June 20) 1924. Mueller, E. F., and Myers, C. N.: The Effect on the Involuntary Nervous System of Arsenicals and the Salvarsan Group, Proc. Soc. Exper. Biol. & Med. **21**: 474, 1924. Rosen, I.; Mueller, E. F., and Myers, C. N.: The Relation of Silver Arsphenamin to the Involuntary Nervous System and to the So-Called Nitritoid Crisis, Arch. Dermat. & Syph. **10**: 607 (Nov.) 1924. Bucky, G., and Mueller, E. F.: Strahlende Energie, Haut und Autonomes Nervensystem, München. med. Wchnschr. **72**: 883 (May 29) 1925.

METHOD OF ADMINISTRATION

The most promising and effective way of administering sodium thiosulphate is by the intravenous injections of a 5 per cent. solution; 10 c.c. of the solution contains 0.5 gm. of sodium thiosulphate; i. e., 7½ grains. According to the method of treatment advised by McBride and Dennie, 0.3 gm. of sodium thiosulphate is given intravenously; the following day, 0.45 gm.; the third day, 0.6 gm.; the fourth day, 0.9 gm.; the sixth day, 1.2 gm., and the eighth day, 1.8 gm. This is usually sufficient for the cases of arsenical dermatitis. The treatment of the cases reported in this article began with smaller doses and was not increased above 1 gm. We never observed any bad effects after even daily injections of 1 gm. over a period of fourteen days. Usually it is sufficient, even for severe cases of arsenical dermatitis, to give from five to twelve injections. After the first dose, the redness, edema and serous exudate usually began to decrease.

Sometimes it is necessary to give the intravenous injections into the jugular vein, if marked generalized edema with dermatitis prohibits the application in the veins of the extremities. In very edematous cases we used oral administration until the acute swelling passed. In this case we start with an average dose of 2 gm. in from 120 to 200 c.c. of physiologic sodium chlorid solution. Salt solution is used instead of distilled water because it decreases the vomiting,[6] which often occurs after oral sodium thiosulphate medication, and decreases the rate of decomposition of the thiosulphate in the stomach. The dose of 2 gm. may be increased to 10 gm. without after-effects, excepting a slight diarrhea. As mentioned above, the oral method, especially in higher doses, is often interfered with by vomiting, beginning shortly after each application. We find it advisable to start oral administration with 2 gm. in from 120 to 150 c.c. of physiologic sodium chlorid solution, given in the morning and late in the afternoon. Rectal and vaginal administration has not been used by us.

METHOD OF DETERMINING ARSENIC

The twenty-four hour collection of urine is thoroughly mixed and a portion withdrawn for the determination of the arsenic content. One hundred cubic centimeters of urine is digested in an 800 c.c. Kjeldahl flask in 20 c.c. of concentrated sulphuric acid, to which is added from 5 to 10 c.c. of concentrated nitric acid, 5 gm. of potassium sulphate, and a small crystal of copper sulphate. When the digestion is completed, any remaining nitrogen oxids are removed by adding 25 c.c. of a saturated solution of ammonium oxalate and heating. The pentavalent arsenic is reduced to the trivalent state by either sulphur dioxid or stannous chlorid. The digest is then diluted with distilled water to exactly 100 c.c. at 20 C. The arsenic is determined in duplicate samples of this solution by the Gutzeit method. The reagents used are practically arsenic free, and frequent control determinations are made, using arsenic free urine.

The same method is used in determining the arsenic content of the scale in the cases of dermatitis exfoliativa. Scales are collected from different portions of the body and mixed in about equal proportions. From 1 to 3 gm. is digested, the same procedure being used as outlined above. The results for both are calculated for the arsenous oxid.

6. Lehmann, E. P., and Gibson, H. V.: A Simple Immediate Treatment for Vomiting, J. A. M. A. 84: 1259 (April 25) 1925.

DERMATITIS EXFOLIATIVA

Under the head of dermatitis exfoliativa we have included all cases showing a skin rash. Ten cases have been observed mostly during the first stage of eruption. The onset began with an edema and redness around the eyes, neck and upper part of the chest. Since there was marked uniformity of the clinical symptoms, and since all the patients had received two or three neo-arsphenamin injections, only two histories are reported.

CASE 1.—A man, aged 20, contracted syphilis. Treatment with mercury and neo-arsphenamin began, Jan. 10, 1924, during the secondary stage with roseola, mucous patches and papules. Twenty-four hours after the second injection of 0.6 gm. of neo-arsphenamin, January 24, the patient developed a rash which was most prominent around the upper eyelids and on the lower part of the neck, with marked itching. The urine contained albumin. Sodium thiosulphate, 0.5 gm., was given intravenously. January 25, there was a marked decrease of the redness, and the itching had ceased. January 26, the urine was free of albumin, and the rash was less pronounced. Sodium thiosulphate, 1 gm., was given intravenously. January 29, there was scaling around the eyelids and neck; the urine was normal. Sodium thiosulphate, 1.5 gm., was given intravenously. January 31, there were no clinical symptoms excepting slight redness of the previously affected portions of the skin.

TABLE 1 (Case 2).—*Arsenic Excretion in Urine and Scales*

24 Hours Ending 6 a. m.	Total Volume Urine Excreted, C.c.	Total Arsenous Oxid Excreted in 24 Hours, Mg.	Comment
4/ 2/25	880	2.4	8.3 mg. arsenous oxid per 100 gm. scale
4/ 3/25	850	1.8	
4/ 4/25	985	2.5	2 gm. sodium thiosulphate by mouth
4/ 5/25	845	2.54	2 gm. sodium thiosulphate by mouth
4/ 6/25	550	4.7	
4/ 7/25	745	1.6	4 mg. arsenous oxid per 100 gm. scale; 4 gm. sodium thiosulphate by mouth; part lost emesis
4/ 8/25	750	2.1	2 gm. sodium thiosulphate by mouth
4/ 9/25	700	1.6	2 gm. sodium thiosulphate by mouth
4/10/25	710	2.6	2 gm. sodium thiosulphate by mouth
4/11/25	1,000	6.0	2 gm. sodium thiosulphate by mouth
4/12/25	655	4.5	2 gm. sodium thiosulphate by mouth
4/13/25	555	3.3	2.2 mg. arsenous oxid per 100 gm. scale; 2 gm. sodium thiosulphate by mouth
4/14/25	170	8.5	2 gm. sodium thiosulphate by mouth; 200 c.c. urine lost
4/15/25	750	4.8	
4/16/25	800	2.24	
4/17/25	810	2.26	
4/18/25	1,330	1.59	
4/19/25	1,155	1.45	
4/20/25	1,260	2.76	2.4 mg. arsenous oxid per 100 gm. scale
4/21/25	1,015	1.1	
4/22/25	Lost		
4/23/25	Lost		
4/24/25	Lost		
4/25/25	Lost		
4/26/25	515	1.65	
4/27/25	600	1.02	
4/28/25	990	0.58	1 mg. arsenous oxid per 100 gm. scale
4/29/25	660	0.23	
5/ 4/25	...	....	1.2 mg. arsenous oxid per 100 gm. scale
5/ 7/25	780	0.28	
5/ 8/25	Lost	....	0.5 gm. sodium thiosulphate intravenously
5/ 9/25	400	0.46	
5/10/25	200	0.06	0.5 gm. sodium thiosulphate intravenously
5/11/25	790	0.87	0.74 mg. arsenous oxid per 100 gm. scale
5/12/25	Lost		
5/13/25	550	0.11	

Following this, mercuric salicylate was the only antisyphilitic medicament employed until April 10, when combined mercuric salicylate and neo-arsphenamin treatment was begun, during which the arsphenamin dose never exceeded 0.45 gm. No further untoward effects occurred. The patient has received, to the present, five courses of combined treatment and has had no signs of skin irritation.

CASE 2 (courtesy of Dr. R. L. McIntosh).—L. C., a girl, aged 16, who had secondary syphilis, developed a severe exfoliativa arsenical dermatitis after the fourth injection of 0.6 gm. of neo-arsphenamin. Owing to the

pronounced general edema, attempts to give sodium thiosulphate intravenously were not very successful, and most of the treatment was given by mouth. The arsenic excretion was followed both in the urine and in the scales. The results are given in Table 1 and Chart 1. In this case the excretion of arsenic was definitely increased after the administration of sodium thiosulphate. The arsenic content of the scales decreased steadily, but this, perhaps, cannot be attributed to the thiosulphate treatment.

JAUNDICE AFTER NEO-ARSPHENAMIN INJECTIONS

Cases in this group were in the latent stage of syphilitic infection when treatment began. After the third and fourth injection of neo-arsphenamin the patients developed jaundice of the sclera of the eyes and skin. The urine was brownish and gave a positive test for bilirubin. They received from 0.25 to 0.5 gm. of sodium thiosulphate intravenously. Under this treatment and a fat-free diet the clinical findings cleared up rapidly. The further treatment consisted of mercury rubs only, and there were no further skin manifestations.

CASE 3.—G. S., a youth, aged 18, committed to the hospital, Oct. 20, 1924, with the diagnosis of syphilitic iritis on a congenital syphilitic basis, received neo-arsphenamin, October 24, and 31. The next day the patient complained of headaches, vertigo and nausea, and developed a slight jaundice. November

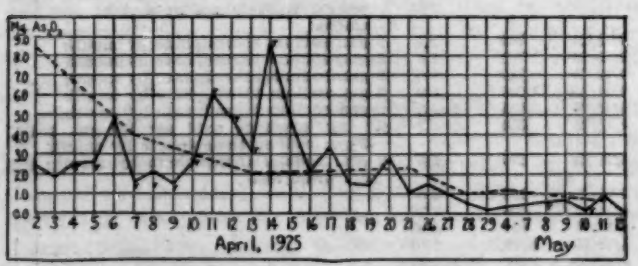

Chart 1.—Excretion of arsenic in urine and skin before and after sodium thiosulphate treatment in severe exfoliative arsphenamin dermatitis (Case 2). *T*, given sodium thiosulphate; broken line, arsenous oxid in 100 gm. scales; solid line, arsenous oxid in twenty-four hour urine.

12, he received 0.5 gm. of sodium thiosulphate, after which the subjective complaints became less. After the injection of sodium thiosulphate, the icterus faded and the patient felt well. The arsenic excretion was not followed in this case.

CASE 4.—R. M., a youth, aged 19, with congenital syphilis, developed a severe jaundice with nausea, vomiting and headaches, during treatment with neo-arsphenamin. He received a total of five doses intravenously of sodium thiosulphate, each dose consisting of 0.25 gm., over a period of eleven days. The jaundice faded rapidly, and the general conditions improved practically from the first treatment with the thiosulphate. The arsenic in the urine was followed for three days before the first dose of thiosulphate. The arsenic excretion rose slightly after the first dose and then decreased to a trace after the next dose of thiosulphate. The urine was analyzed daily for the following ten days and showed only a trace of arsenic.

POLYNEURITIS AFTER ARSENICAL INTOXICATION

Polyneuritis after injections of high doses of arsphenamins has been very rarely observed while, on the other hand, milder forms of nerve irritations resulting in numbness and formication are well known. Widespread arsenical polyneuritis has been reported from England, after the intake of beer that contained arsenic, and from Philadelphia, after the drinking of "moonshine" which had been manufactured in distilleries using lead pipes. The following case is interesting because the clinical findings were those of an alcoholic polyneuritis, while the blood findings, stippling of the erythrocytes, pointed toward a lead intoxication. However, repeated analysis failed to demonstrate lead in the urine; but there was a constant output of arsenic in the urine and feces. The arsenic excretion and the improvement after intravenous sodium thiosulphate injections led to a diagnosis of an arsenical polyneuritis.

CASE 5.—Mrs. L. M., aged 35, had healthy children and had suffered no serious diseases. In January, 1924, after having drunk several glasses of "moonshine," she complained

TABLE 2 (Case 5).—*Arsenic Excretion in Urine and Scales*

24 Hours Ending 6 a. m.	Total Volume Urine Excreted, C.c.	Total Arsenous Oxid Excreted in 24 Hours, Mg.	Comment
1/15/25	950	0.67	4 p.m. 0.5 gm. sodium thiosulphate intravenously
1/16/25	1,035	0.7	8 a. m. 0.3 gm. sodium thiosulphate intravenously
1/17/25	2,400	1.4	8 a. m. 0.3 gm. sodium thiosulphate intravenously
1/18/25	1,080	0.63	
1/19/25	1,867	11.48	5 p. m. 0.3 gm. sodium thiosulphate intravenously
1/20/25	1,730	0.94	
1/21/25	1,645	0.4	5 p.m. 0.5 gm. sodium thiosulphate intravenously
1/22/25	1,750	0.6	
1/23/25	2,780	0.7	
1/24/25	2,865	1.15	
1/25/25	3,290	0.82	
1/26/25	1,025	0.34	
1/27/25	2,585	0.24	
1/28/25	2,510	1.4	
1/29/25	2,700	0.55	3 p. m. 0.25 gm. sodium thiosulphate intravenously
1/30/25	2,790	2.12	6 p. m. 0.25 gm. sodium thiosulphate intravenously
2/ 1/25	2,020	0.47	
2/ 2/25	2,060	0.2	
2/ 3/25	2,680	0.2	
2/ 4/25	2,500	0.88	
2/ 5/25	1,800	1.35	6 p. m. 0.25 gm. sodium thiosulphate intravenously
2/ 6/25	2,675	3.08	8 p. m. 0.25 gm. sodium thiosulphate intravenously
2/ 7/25	3,025	2.27	8 p. m. 0.25 gm. sodium thiosulphate intravenously
2/ 8/25	2,250	1.86	
2/ 9/25	2,150	0.55	
2/10/25	2,380	0.36	8 p. m. 0.25 gm. sodium thiosulphate intravenously
2/11/25	2,800	4.9	3 p. m. 0.25 gm. sodium thiosulphate intravenously
2/12/25	2,830	0.15	4 p. m. 0.25 gm. sodium thiosulphate intravenously
2/13/25	1,740	0.13	4 p. m. 0.25 gm. sodium thiosulphate intravenously
2/14/25	1,170	Trace	
2/15/25	2,300	0.25	
2/16/25	2,040	0.6	
2/17/25	1,230	0.37	Incomplete sample
2/18/25	2,850	0.57	
2/19/25	1,500	0.48	
2/20/25	2,200	0.11	
2/21/25	1,275	Trace	
2/22/25	1,400	0.14	
2/23/25	1,400	Negative	
2/24/25	1,350	Negative	
2/26/25	875	Trace	
3/12/25	2,200	0.27	
5/21/25	Qual.	Negative	

of tingling in the finger tips and vomiting. After four days, during which the stomach was washed out several times, these symptoms disappeared. In November, 1924, after a party in which the members drank heavily of "moonshine," the stomach trouble recurred. The patient vomited every morning and felt very weak. These vomiting spells continued and occurred after each meal. She vomited finally twelve times a day. In the first week of December, 1924, there was noted a weakness of the lower extremities, with tingling sensations in the toes. The weakness increased, and the upper extremities became involved. The patient became bedridden, and was unable to use the hands even for personal duties. Further inquiry elicited information of a steady drinking of perhaps from 2 to 4 fluidounces of "moonshine" daily. It was not made at home but was obtained from a nearby distillery in

large tin cans. These cans contained no lead, nor were there any lead pipes in the house.

The attending physician gave the patient eight injections of sodium cacodylate, after which the tingling sensations, the weakness of the hands and feet and the muscle pain on pressure increased.

Examination revealed that the skin and mucous membranes were whitish; there was a slight edema around the eyes and ankles. There was a pronounced wrist-drop on both sides, with atrophy of the muscles of the forearms and hands, as well as of the lower extremities, more pronounced in the foot muscles, with inability to flex or extend toes, feet, legs, fingers, hands or arms. Paralysis was more pronounced in the extensors and abductors. The tendon and superficial reflexes were absent. The deep sensory perception was disturbed in the toes and feet, slightly in the knees, and very pronounced in the fingers and hands. The electric examination gave no reaction with the faradic current in the affected muscles of the feet; it gave a decreased reaction with direct stimulation in the flexors and extensors of the forearms and legs. The reaction of degeneration was noted in the thenar and hypothenar, as well as in the interossei of both hands and also of the gastrocnemius. The urine contained albumin but no casts. Anemia was not very pronounced, while the erythrocytes showed basophilic degeneration. Table 2 and Chart 2 demonstrate the effect of the sodium thiosulphate medication on the arsenic output in the urine.

Under thiosulphate and hydrotherapy the patient improved and was able to use the hands, arms and legs, although the muscles of the feet are still paralyzed. Electrotherapy and massage were applied after the arsenous oxid output had reached a low level over a long period.

ACUTE MERCURY INTOXICATION [7]

CASE 6.—A sailor, aged 37, had been in a very good physical condition. The character of the complaints and behavior of the patient led the physician in charge to a diagnosis of neurasthenia. April 13, 1925, the patient was depressed over some domestic trouble. He obtained several mercuric chlorid tablets, one of which was swallowed. A marked burning in the mouth and throat was produced. About 1:30 p. m., a few hours after swallowing the tablet, the patient was seen by a medical officer, who thought that he was intoxicated. The physician was not aware of the fact that mercuric chlorid had been taken, but he prescribed 1/40 grain (1.6 mg.) of apomorphin. About 2 o'clock the medical officer was informed of the intended suicide with mercuric chlorid, and the patient received buttermilk and egg-white, which was vomited almost immediately. The man became extremely excited. The pulse rate was 140 a minute. The urine obtained at 3 o'clock showed casts and albumin. During the night the patient vomited several times. None of the vomitus was analyzed for mercury. April 14, the patient showed a dirty, dry tongue, reddened gums, foul breath, marked salivation, abdominal distention and marked general prostration. At 3 p. m., 0.5 gm. of sodium thiosulphate in 10 c.c. of water was given intravenously. The urine contained albumin and red cells. About one hour after this injection, the patient stated that he felt distinctly more comfortable. April 15, the tongue was cleaner, and abdominal distention less; salivation was still present but decreased. The patient felt quite comfortable and looked improved. He passed 1,000 c.c. of urine, which was negative for albumin, red cells or casts. Sodium thiosulphate was given in 0.5 gm. doses at 9 a. m. and 3 p. m. He made an uneventful recovery. No further sodium thiosulphate treatment was given.

This case demonstrates that sodium thiosulphate is effective in early cases of mercury intoxication and prevents also further development of kidney conditions.

7. Case 6 is presented through the courtesy of Lieut. R. P. Parsons, M. C., U. S. Navy, Great Lakes Naval Hospital.

ACUTE ARSENICAL POISONING

CASE 7 (courtesy of Dr. W. A. Mowry).—Miss O. L., aged 18, took about a teaspoonful of arsenous oxid, approximately 6 gm., at 1:30 p. m., May 26, 1925, with suicidal intent. The patient stated that the arsenous oxid, which she had taken from a chemical laboratory about a year previously, was crystalline in structure and a little coarser than powdered sugar. She had eaten nothing for five hours prior to taking it. About 2:30 she had some pain in her stomach and was nauseated, but did not vomit. The pain became severe about an hour later, and she vomited. She continued to walk around, and between 4 and 5 p. m., ate some hot milk toast. Following this, there was persistent vomiting and considerable pain. About 6 p. m. she admitted to her roommate that she had taken poison, and she was taken to the hospital immediately, where she was admitted at 6:20.

Lavage was not very successful, because of persistent vomiting. She was given egg albumin, which was retained about ten minutes, and also an enema. Bismuth and codeine were given by mouth, but were expelled in a few minutes. The pulse rate was 130, and the respiration, 24. A digitalis preparation and glucose were given hypodermically. At 8:30 p. m., 0.25 gm. of sodium thiosulphate was given intravenously.

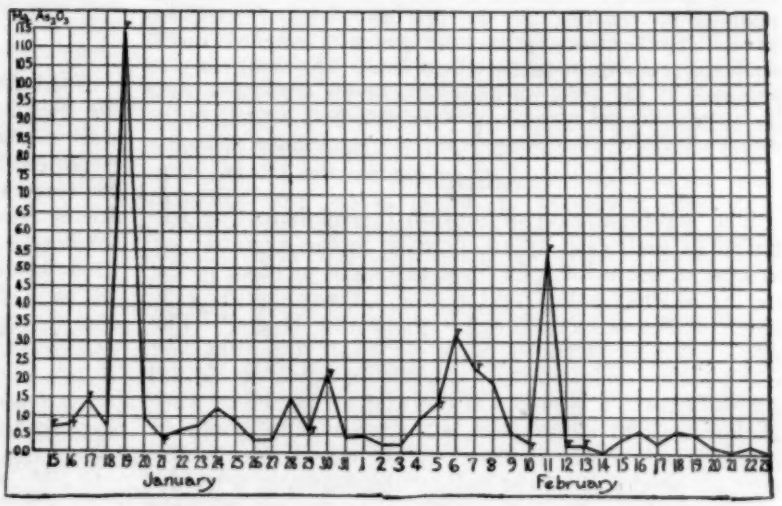

Chart 2.—Excretion of arsenic in urine before and after sodium thiosulphate treatment in arsenical polyneuritis (Case 5).

At 10 p. m., the pulse rate was 160; nausea was intense; but the pain was not severe. At 11 p. m., 0.5 gm. of sodium thiosulphate was given intravenously. At this time it looked as though the patient would die.

At 2 a. m., on the 27th, 90 c.c. of urine was removed by catheter and, on analysis, showed 4.5 mg. of arsenous oxid, albumin, acetone, glucose, many casts, and occult blood. An enema at 2:40 a. m., on analysis, yielded 20 mg. of arsenous oxid per hundred cubic centimeters. A sample of vomitus taken a little later contained 1 mg. of arsenous oxid per hundred cubic centimeters.

The patient seemed a little stronger on the 27th; the pulse was not so rapid, and was of better quality. Vomiting was less frequent. A severe headache persisted all day. She was given 0.25 gm. of sodium thiosulphate at 1:30 p. m., and later 0.5 gm., both intravenously. By 8 p. m., she was able to retain 8 gm. of sodium thiosulphate given in albumin water by mouth. Proctoclysis and hypodermoclysis were continued at intervals.

On the 28th, the pulse rate was from 120 to 128, and the patient was fairly comfortable. Voided urine showed 1.8 mg. of arsenous oxid per hundred cubic centimeters, albumin, acetone, many casts, and a trace of occult blood. She received two doses of 0.5 gm. each of sodium thiosulphate intravenously and one of .8 gm. in saline solution by mouth.

On the 29th, a mild stomatitis and conjunctivitis which persisted for a few days developed. The fluid output was 40

per cent. of the intake. The urine was highly acid and contained many casts. The patient was given 1.3 gm. of sodium bicarbonate by mouth, three times daily to decrease the acidity of the urine. Two doses each of 0.5 gm. of sodium thiosulphate intravenously and two of 8 gm. each in saline solution by mouth were given. The same treatment was given on the following day. The patient felt comfortable and was able to retain fruit juices and broth. The fluid output was 50 per cent. of the intake; the casts in the urine had decreased markedly, and there was only a trace of albumin. There was no diarrhea.

Beginning on the 31st, and continuing for eight days, the patient was given daily 1 gm. of sodium thiosulphate, intravenously, and two doses of 8 gm. each, by mouth. June 2, the urine showed a trace of albumin and a few casts. The fluid output was practically normal. Both the urine and the feces contained arsenic. The patient was allowed to be up for several hours.

There were no complications and the patient was discharged, June 8, thirteen days after admission. The arsenic output had dropped to about 1.5 mg. in 4 liters of urine.

The usual fatal dose of arsenous oxid is less than 1 gm., while in this case the patient recovered after taking about 6 gm. The conditions for absorption were favorable, as the arsenous oxid was finely powdered and was taken into an empty stomach. Although probably a large portion was removed by vomiting and through the intestinal tract, the amount absorbed, judging from the symptoms and the chemical findings, probably would have been fatal. The rapid recovery and lack of the usual complications, severe stomatitis, jaundice, nephritis and neuritis, must be attributed largely to the sodium thiosulphate treatment.

COMMENT

The administration of sodium thiosulphate was followed in each case by an increase in the excretion of arsenic in the urine. In some cases the increase in the excretion was marked, and in others it was slight. This confirms the observation of Groehl and Myers.[8] The more marked increases were of short duration and could not be maintained by subsequent doses of sodium thiosulphate. The peaks in the rate of excretion were always several days apart, even with daily doses of thiosulphate. This increase may be due in part to the diuresis produced by the sodium thiosulphate, or to the action of the sodium thiosulphate on the arsenic held in combination in the tissues, as suggested by Groehl and Myers. This simple mechanism does not entirely explain all the facts.

One of the most striking effects of this treatment has been the prompt disappearance of albumin and casts from the urine. This occurred despite an increased amount of arsenic in the urine. Apparently the drug has the property of protecting the kidney against damage by arsenic and tends to restore the normal renal function. To confirm this, a series of rabbits was given a lethal dose, intravenously, of sodium arsenite and treated subsequently with sodium thiosulphate. Another series of rabbits was given the same dose of sodium arsenite but no sodium thiosulphate. The pathologic damages in the kidneys were less marked in the treated animals than in those receiving no treatment with thiosulphate. Anuria always occurred in the untreated animals but never in those treated with sodium thiosulphate. The damage produced by the sodium arsenite in the liver and spleen was practically the same in both the treated and the untreated series. Apparently, one function of the sodium thiosulphate is on the rapid restoration of one of the main excretory organs, the kidneys, to normal.

Another factor which may be significant is the possible effect of sodium thiosulphate on intracellular oxidation. It has long been known that arsenic affects metabolism. Voegtlin[9] and his co-workers recently presented evidence as to the chemical nature of the arsenoceptor in the tissue first proposed by Ehrlich. Voegtlin believes this receptor in the tissues to have the general form *R*-SH and agrees with the trend of recent work that this grouping is essential to intracellular oxidation. He states that apparently sodium thiosulphate does not act by replacing the *R*-SH group removed by the arsenical and thus maintaing intracellular oxidation, and he is able to offer no explanation of the mechanism of the action of thiosulphate in protecting against damage by arsenic.

Sodium thiosulphate in the body is oxidized to sodium sulphate,[10] and a molecule of sulphur is liberated. Hottinger[11] has pointed out that sulphur in the body may also play a rôle in biologic oxidation, similar to that of the *R*-SH group.

Further experimental evidence on the chemical and pathologic effect of sodium thiosulphate in the treatment of heavy metal poisoning is being accumulated and will be published in subsequent papers.

SUMMARY

Sodium thiosulphate has been found efficacious in the treatment of arsphenamin dermatitis and jaundice, and in acute arsenical and mercurial poisoning. The treatment increases the excretion of arsenic and hastens the restoration of the kidneys to normal. Saline solution is recommended as the solvent when sodium thiosulphate is given by mouth.

8. Groehl, Marion R., and Myers, C. N.: Sodium Thiosulphate in Treatment of Metallic Intoxication, Therap. Gaz. **40**: 691 (Oct. 15) 1924.

9. Voegtlin, Carl; Dyer, Helen A., and Leonard, C. S.: On the Specificity of the So-Called Arsenic Receptor in the Higher Animals, J. Pharmacol. & Exper. Therap. **25**: 297 (May) 1925.

10. Nyiri, W.: The Fate of Sodium Thiosulphate in the Organism, Biochem. Ztschr. **141**: 160 (Sept. 28) 1923.

11. Hottinger, A.: The Mode of Action of Sulphur, Schweiz. med. Wchnschr. **4**: 429 (April 26) 1923.

SODIUM THIOSULPHATE IN MERCURIAL POISONING

AN EXPERIMENTAL STUDY *

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Both experimental and clinical observations indicate that the absorption of mercuric chlorid occurs rapidly after its oral administration. Burmeister and McNally[1] found that large amounts of mercury were present in the blood of a dog within three minutes after a massive dose of mercuric chlorid had been placed in the stomach of the animal; indeed, in this lapse of time, "irreparable kidney parenchyma degenerations" had been produced.[2] Unfortunately, many cases of mercuric chlorid poisoning encountered clinically do not come under treatment for hours after the administration of the poison; consequently, much of the mercury must have gained entrance into the circulation. It is obvious, therefore, that an agent which is capable of

* From the Department of Pharmacology, Medical College of Virginia.

1. Burmeister, W. H., and McNally, W. D.: Acute Mercury Poisoning, J. M. Res. **36**: 87 (March) 1917.

2. Burmeister, W. H.: The Effect of Extensive Venesection and Transfusion on Kidney Lesions in Severe Acute Mercuric Chloride Poisoning, J. Lab. & Clin. Med. **2**: 500 (April) 1917.

neutralizing the poison and hastening its elimination is to be desired.

A number of "antidotes" have been proposed for mercuric chlorid; most of these have been shown to be of no value; one, at least, when administered intravenously, is actually injurious.[3]

Dennie and McBride,[4] following the suggestion of Ravaut,[5] have recently advocated the use of sodium thiosulphate as an antidote for a whole group of toxic metals. There seems to be considerable clinical evidence that this salt is distinctly useful in certain forms of arsenical poisoning; moreover, Voegtlin [6] has offered proof of this, secured by animal experimentation. On the other hand, clinicians who have used sodium thiosulphate in mercurial poisoning are not in agreement as to its efficacy in this form of intoxication. Dennie and McBride,[4] in their first publication, said: "While the beneficial action of sodium thiosulphate is most remarkable in arsenical dermatitis, it is even more so in the treatment of acute mercurial poisoning and mercurial stomatitis." Later, they modified their view as to the mechanism of the action of the antidote, but their enthusiasm appears to have suffered no abatement; for they believe "sodium thiosulphate is a highly efficient and rapid neutralizing agent for the common metallic poisons, arsenic, mercury, lead and bismuth." [7] Semon [8] also feels that sodium thiosulphate is of unquestioned value in the treatment of mercurial stomatitis and that "it may be found, furthermore, to be an indispensable adjunct in the treatment of all cases of acute metallic poisoning."

Opposed to these views, Schamberg [9] early expressed skepticism regarding the efficacy of sodium thiosulphate in mercury poisoning; he felt that it "will have to await more extended clinical trial." Michael [9] found that, in his hands, mercurial stomatitis seemed unaffected by the administration of thiosulphate; Cole [9] had "several experiences with severe mercurial intoxication and in none of these cases did the introduction of this drug intravenously or by mouth have any effect on the condition."

Unfortunately, Dennie and McBride do not give certain rather essential details in the histories of the few cases of mercurial poisoning that they report. They state [7]: "It is a well known fact that mercuric chlorid is nearly always fatal, if taken in doses of 7½ grains (0.5 gm.) or more, on an empty stomach." They say, further, that more than forty cases have been treated "by this method"; referring apparently to the thiosulphate method. They neglect to state, however, whether all of the more than forty patients were fasting long enough before the administration of the mercury to insure the empty stomach on which they base their bad prognosis, in the absence of thiosulphate treatment; they fail to mention whether gastric lavage was practiced; no note is made of whether emesis occurred. Finally, they report a mortality of approximately 10 per cent.; certainly not a low figure as compared with that given in larger series not having the benefit of thiosulphate medication.

It is a matter of record that recovery has been reported following the oral administration of one or even more than one 7⅗ grain tablet (0.48 gm.) of mercuric chlorid, when very different methods of treatment have been employed, some of these methods being the most bizarre and least likely to exert a favorable action. Naturally, the minimal fatal dose of mercuric chlorid for human beings by oral administration must remain a matter of speculation; in dogs, when the animals have been fasted twenty-four hours and given morphin to prevent emesis, as much as 25 mg. per kilogram of body weight may be required to cause death, though some dogs, under the same conditions may fail to survive a smaller dose. On the other hand, it is so rare for a dog, regardless of age or weight, to survive the intravenous injection of 4 mg. of mercuric chlorid per kilogram that we suspect technical error when this does occur. Indeed, a considerable proportion of the animals die after the intravenous injection of 3 mg. of mercuric chlorid per kilogram. Taking the upper limits for the fatal oral dose (25 mg. per kilogram) and the fatal intravenous dose (4 mg. per kilogram) in the dog, it is apparent that the former is a little over six times as large as the latter.

Lambert and Patterson [10] report a fatal outcome in a patient who received 1½ grains (0.1 gm.) of mercuric chlorid intravenously; this patient, however, was suffering from some pathologic condition, and it is probable that his resistance to the poison was diminished. Vecki [11] reports poisoning after as little as 3 mg. of mercuric chlorid intravenously; and, apparently, the injection of 0.02 gm. by this route was followed by a severe reaction. On the other hand, Dr. W. F. Grigg and Dr. Howard Urbach inform us that they have used as much as 1 grain (0.065 gm.) intravenously in adults. In one case, the patient did not weigh more than 130 pounds (59 kg.) and in no instance did they observe unfavorable results that could be attributed to the mercuric chlorid. It must be accepted that the intravenous injection of as much as 1 mg. of mercuric chlorid per kilogram of body weight has been survived by human beings; it would seem justifiable to assume, therefore, that six times this amount, namely, 6 mg. per kilogram of body weight, would be survived if the poison was given orally. If this is correct, a patient weighing 70 kg. could absorb as much as 6½ grains (0.43 gm.) of mercuric chlorid from the alimentary canal and yet survive. There are fewer more potent emetics than mercuric chlorid. Rarely does profuse emesis fail to occur rather promptly after the oral administration of this poison; it is probable that a portion of the administered poison is expelled in this way and escapes absorption. Naturally, the rate at which mercuric chlorid passes from the stomach will vary in different individuals, and in the same individual under different conditions. It is the almost universal practice to employ gastric lavage, as soon as the patient is seen; if this procedure is resorted to within any reasonable time after the ingestion of the poison, it is to be assumed that this measure also removes some of the mercury and prevents its absorption. Therefore, it seems unjustifiable to take for granted that the oral administration of 7⅗ grains (0.48 gm.) of mercuric

3. Haskell, C. C., and Courtney, R. H.: The Value of Calcium Sulphide in the Treatment of Poisoning by Mercuric Chloride, J. Lab. & Clin. Med. **3**: 110 (Nov.) 1917.
4. Dennie, C. C., and McBride, W. L.: Treatment of Arsphenamin Dermatitis and Certain Other Metallic Poisonings, Arch. Dermat. & Syph. **7**: 63 (Jan.) 1923.
5. Ravaut, cited by Dennie and McBride (Footnote 4).
6. Voegtlin, Carl; Dyer, H. A., and Leonard, C. S.: On the Specificity of the So-Called Arsenic Receptor in the Higher Animals, J. Pharmacol. & Exper. Therap. **25**: 297 (May) 1925.
7. Dennie, C. C., and McBride, W. L.: Treatment of Arsphenamin Dermatitis, Mercurial Poisoning and Lead Intoxication, J. A. M. A. **83**: 2082-2085 (Dec. 27) 1924.
8. Semon, H. C.: An Antidote for Arsenic, Bismuth and Mercury Poisoning, Brit. M. J. **1**: 662 (April 12) 1924.
9. In discussion on Dennie and McBride (Footnote 7).
10. Lambert, S. W., and Patterson, H. S.: Poisoning by Mercuric Chlorid and Its Treatment, Arch. Int. Med. **16**: 865 (Nov.) 1915.
11. Vecki, V. G.: The Use of Intravenous Injections of Mercuric Chlorid, J. A. M. A. **72**: 1596 (May 31) 1919.

chlorid to an adult human being in good condition would be "nearly always fatal," even in the absence of thiosulphate medication.

Because of such considerations as these, it seemed most desirable to investigate the efficacy of sodium thiosulphate as an antidote in dogs that had been poisoned with a definite amount of mercuric chlorid. Not only could the matter of dosage of the poison be accurately controlled, but treatment could be limited to the method under investigation, and other measures that might exert an influence on the course of the poisoning be omitted.

As has been pointed out, the fatal dose of mercuric chlorid for dogs by oral administration varies considerably, although precautions are taken to have the stomach empty, and morphin is given to prevent emesis. Moreover, in the present investigation, we were concerned with the action of sodium thiosulphate against the mercury that had passed from the alimentary canal and entered the circulation. Because of these reasons, the intravenous method of administering the poison was employed. Sansum [12] has determined that 4 mg. of mercuric chlorid per kilogram injected intravenously is invariably fatal to the dog; in the single instance in which this dose was survived in our experiments, we had reason to believe that a portion of the solution escaped outside the vein.

According to Dennie and McBride,[4] a dose of as much as 2 gm. of sodium thiosulphate may be injected intravenously into man, with impunity. As judged by the immediate effects following the injection of sodium thiosulphate intravenously into dogs and the behavior of the animals for several days subsequently, the salt must have an extremely low toxicity. In the form of a 10 per cent. solution in distilled water, doses of 0.1 and 0.2 gm. per kilogram cause not the least appearance of discomfort and have no effect on the animal's health. As much as 2 gm. per kilogram was injected intravenously in 50 per cent. solution; emesis resulted, but the following day the dog seemed normal.

TABLE 1.—*Results of Thiosulphate Medication in Dogs Poisoned by Mercury*

Number	Weight in Kg.	Dose Hg, Mg. per Kg.	Dose of Thiosulphate, Mg. per Kg.	Interval Between Hg Administration and Thiosulphate	Duration of Life
27*	8.8	4	50	8 minutes	4 days
28*	9.8	4	50	2 minutes	4 days
29*	9.5	4	50	1 minute	5 days
32*	11.9	4	50	2 minutes	3 days
33†	6.8	4	50	7 minutes	5 days
34*	13.2	4	50	2 minutes	3 days
30	14.4	4	0	.....	3 days
31	20.4	4	0	.....	4 days

* Received two injections of thiosulphate.
† Received three injections of thiosulphate.

Dennie and McBride [7] recommend a maximum dose of 1.8 gm. of sodium thiosulphate; in view of the apparent high tolerance of dogs for this salt, it was felt that a dose of 0.05 gram per kilogram could be used with safety.

The first experiments were carried out during April and May, 1925. Eight dogs were given a dose of 4 mg. of mercuric chlorid per kilogram, a 1 per cent. solution in distilled water being injected into the marginal ear vein. Two of the animals served as controls; the remaining six were given intravenous injections of a freshly prepared solution of "chemically pure" sodium thiosulphate within a few minutes after receiving the mercury. In the case of five of these treated dogs, a second injection of freshly prepared thiosulphate solution was made twenty-four hours later; the sixth dog received such an injection at the end of twenty-four and at the end of forty-eight hours. The results of these experiments are given in Table 1.

The average duration of life for the treated dogs was four days; that for the two controls was three and one-half days. In a series of dogs given the dose of 4 mg. of mercuric chlorid earlier in the year, the average duration of life was 4.6 days without treatment; from this, the inference appears to be justified that the intravenous injection of a large dose of sodium thiosulphate, within a few minutes after a fatal dose of mercuric chlorid had entered the circulation, had not the least influence on the course of the poisoning.

TABLE 2.—*Repeated Administration of Thiosulphate to Dogs Poisoned by Mercuric Chlorid*

Number	Weight in Kg.	Dose Hg, Mg. per Kg.	Dose of Thiosulphate, Mg. per Kg.	Interval Between Hg Administration and Thiosulphate	Duration of Life
35	10.9	4	50*	2 minutes	5 days
36	14.5	4	50†	3 minutes	3 days
37	13.7	4	50‡	1 minute	4 days
38	5.9	4	50†	2 minutes	3 days
39	5.3	4	50*	1 minute	5 days
40	10.7	4	0	.....	4 days

* Received a total of five injections of thiosulphate.
† Received a total of three thiosulphate injections.
‡ Received a total of four injections of thiosulphate.

The treatment employed in these dogs differs from that recommended by Dennie and McBride in one important particular: Although the antidote was administered early, in five instances, it was used only twice; in the sixth case, only three times; whereas they recommend the daily administration of the thiosulphate for four doses. Therefore, it was determined to run a second series of experiments, the antidote being injected every twenty-four hours until the death or recovery of the animals.

Six dogs were used in these later experiments; one serving as control. The same dosage and method of administration for the mercuric chlorid was employed. A fresh solution of sodium thiosulphate ("chemically pure") was injected as soon as possible after the injection of the mercury and on each succeeding day until the death of the animal, the dose of thiosulphate being, as in the first experiments, 0.05 gram per kilogram. With these animals, also, the results were disappointing, as may be seen from Table 2.

In spite of early and repeated use of the sodium thiosulphate, the course of the poisoning seemed entirely unaffected. The average duration of life in the five treated dogs was 4.75 days, as compared with a duration of 4.6 days for the series of controls run earlier.

One can scarcely escape the conclusion, therefore, that sodium thiosulphate is of no value as an antidote for the mercury that has gained entrance into the circulation, because in these experiments the antidote was given with much less delay than would be practicable clinically and nevertheless was entirely ineffective, either to save the animals or even to delay the occurrence of death to any significant degree.

12. Sansum, W. D.: The Principles of Treatment in Mercuric Chlorid Poisoning, J. A. M. A. **70**: 84 (March 23) 1918.

Clinical Notes, Suggestions, and New Instruments

A METHOD FOR WASHING FIXED TISSUE*

BERNARD G. H. THOMAS, PITTSBURGH

In the preparation of good histologic sections for microscopic examination, it is essential that all tissue fixed in Zenker's solution or other fixatives containing bichromate should be thoroughly washed in water.

None of the methods used were found to be entirely satisfactory, and it occurred to me that a tea ball might answer the purpose. It fulfilled the requirements and has been found to be very convenient. The tea ball is of the conventional aluminum type that screws together and has a chain with a hook fastened to the top. The ball containing the tissue is simply placed in a vessel of running water, with the hook fastened on the side. With this device, the specimens can be thoroughly washed without injury. The identification tag can either be placed with the tissue or be fastened on the chain. The ball is cheap and easily cleaned.

HERPES ZOSTER SIMULATING NEPHROLITHIASIS

WYNDHAM B. BLANTON, M.D., RICHMOND, VA.

A woman, aged 52, was suddenly affected by pain immediately over and below the left tenth rib posteriorly. The pain was sharp and cutting, did not radiate, and was not affected by breathing. For the past five years the patient had been under observation for an elevation of blood pressure (systolic, 200; diastolic, 110); she had frequent headaches, a faint trace of albumin in the urine, no casts, a negative Wassermann reaction, a blood urea of 25 mg. per hundred cubic centimeters, a normal blood count, and normal stools. There was moderate tenderness on the left side over an area about the size of the hand, extending from the tenth rib down. The greatest tenderness seemed to follow the course of the last intercostal nerve. The impression was intercostal neuralgia.

The pain was controlled by acetylsalicylic acid during the daytime, but was worse at night, gradually increasing in severity until the fourth night, when it was very bad. The fifth day the pain was still worse, and the patient was unable to sleep in spite of codein. The pain radiated around the left side as far as the left mid-Poupart's line. On the fifth night, the pain was severe enough to demand morphin for relief. It was chiefly referred to the abdomen over an area about three inches in width and in a line with the umbilicus. The temperature and pulse were normal; there was no nausea or vomiting. Examination showed the heart and lungs to be normal. The urine showed red blood cells (the patient had not menstruated for six months and was considered past the menopause). The impression was renal calculus, involving the left side.

The patient was sent to the hospital for cystoscopy and pyelogram. The findings in both instances were reported negative. On the day she entered the hospital, there was noted a slight macular redness over a small area on the left side of the abdomen corresponding to the site of the pain. This was attributed to mustard plasters. On the seventh day, there was observed at this site a typical patch of herpetic vesicles about the size of a dollar. Considerable soreness persisted, but the pain was much improved. On the eighteenth day after onset the herpetic eruption faded slowly, pain ceased, and the patient began to menstruate. The diagnosis was herpes zoster, involving the tenth left thoracic nerve.

COMMENT

1. Sudden pain over the origin of the tenth left intercostal nerve, associated with tenderness without any other signs, at first gave the impression of intercostal neuralgia.

2. Increasing severity of the pain, its radiation around the left side to the abdomen, and the appearance of red blood cells in the urine in a woman thought to be past the menopause caused the change in diagnosis to nephrolithiasis.

3. Negative findings at cystoscopy and pyelogram, and the beginning of the menstrual flow (for the first time in six months), together with the appearance on the seventh day of a typical herpetic eruption over the site of the abdominal radiation of the pain, lead to a third shift in diagnosis to herpes zoster.

This case is cited as illustrating how herpes zoster with the late appearance of eruption may in its early stages simulate other conditions, particularly nephrolithiasis in the menstruating woman.

300 West Grace Street.

* From the Bureau of Mines, Department of Commerce.

New and Nonofficial Remedies

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION. W. A. PUCKNER, SECRETARY.

CHLORETONE (See New and Nonofficial Remedies, 1925, p. 91).

The following dosage form has been accepted:

Boro-Chloretone: A dusting powder composed of chloretone, 1 part; boric acid, 1 part; purified talc, 2 parts.

POWDERED WHOLE LACTIC ACID MILK-MERRELL-SOULE.—A modified milk preparation prepared from whole milk soured by the action of a culture of *Bacillus bulgaricus*. Each 100 Gm. contains approximately butter fat, 28 Gm.; protein, 26 Gm.; lactose, 33 Gm.; free lactic acid, 4 Gm.; ash, 6 Gm.; moisture, 3 Gm.

Actions and Uses.—When suitably mixed with water, powdered whole lactic acid milk-Merrell-Soule is said to be useful in the feeding of infants when a soured milk is indicated.

Dosage.—To prepare powdered whole lactic acid milk-Merrell-Soule for use, 4½ ounces (16 tablespoonfuls) are added to 32 fluidounces of previously boiled water and stirred until a uniform mixture results. One hundred Cc. of the finished mixture contains, approximately, butter fat, 3.3 Gm.; protein, 3 Gm.; lactose, 3.8 Gm.; ash, 0.7 Gm.

Manufactured by the Merrell-Soule Company, Syracuse, N. Y. No U. S. patent or trademark.

Malignant Disease of the Lung.—Malignant disease of the lung may be either a sarcoma or a carcinoma. The former generally arises in mediastinal glands and is rare in lung tissue except as a direct extension. Carcinoma, on the other hand, arises in the lung and occurs in two forms: (1) a single deposit of growth arising in a large bronchus near the root of the lung and growing outward toward the periphery, and generally producing a secondary bronchiectasis; (2) a diffuse carcinomatosis arising in the finer bronchioles, generally of the lower lobe. The latter is the only form that is at all likely to be confused with pulmonary tuberculosis. The small carcinomatous nodules in this condition are discrete and peribronchial in distribution, grayish, and not unlike small tubercles. . . . As a rule this diffuse carcinomatosis, unlike tuberculosis, attacks the lower lobe; this in itself is a helpful distinction. It also produces very great enlargement of the mediastinal glands, with secondary deposits therein—a greater enlargement than is likely to be found in tuberculosis, and one which is apt to affect the anterior and superior mediastinal groups, which tubercle rarely does.—Gloyne, S. R.: Some Pulmonary Lesions Simulating Tuberculosis, *Tubercle*, November, 1925, p. 61.

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SATURDAY, DECEMBER 5, 1925

MILK MIXTURES FOR INFANT FEEDING

To a person confronted for the first time with the problem of the artificial feeding of infants, the multiplicity of recommendations, many of which claim to be based on "expert" testimony and trial, must tend to be bewildering. He is likely to wonder why and how such seemingly unlike prescriptions could have been suggested for a common need; he can scarcely avoid at least the preliminary conclusion that infant feeding is a practice guided by unconcealed empiricism rather than scientific rationale; he may even doubt the propriety of the dictum that "feeding must be a matter of principle and not of impulse." It has been said that the ordinary problem in artificial feeding is one of adapting cow's milk to the digestive tract of the baby and at the same time providing, as far as possible, a normal supply of all the essentials for nutrition and growth. There are many special devices by which these objects can be attained, and the wise physician adopts the one that seems best suited to the individual case.[1]

According to a recent writer,[2] Underwood, in 1793, was the first to use cow's milk as a food for infants. About the middle of the nineteenth century, the manufacture and sale of proprietary foods became important. Meanwhile, the number of formulas for the use of infants has become legion. As a rule, these food mixtures are expressed as the proportions by weight or volume which the various food components are of the total mass of the food—the so-called percentage system. Powers,[3] of the department of pediatrics, Yale University School of Medicine, has pointed out that certain similarities and differences in foods, so formulated, may be suggested in a vague way; but the essential fact inherent in "the percentage system," namely, that the values of the nutrients are ratios that express only degree of concentration, is often lost sight of. For comparative purposes, especially, it is difficult to perceive significant facts from small, often fractional, percentage values of protein, carbohydrate and fat, which shift with changes in volume. Powers has therefore essayed to compare the composition of a number of milk mixtures in terms of the percentage of each energy-producing nutrient in the total energy value of the food as fed. This method of food evaluation, he points out, has been the means of extricating these heterogeneous mixtures from a maze of quantitative relationships, which are metabolically meaningless, and has made them available for comparative study on a significant basis in terms of "the standard unit of nutritional currency"—the calory—and without regard to water content.

The surprising feature of such an evaluation of feeding mixtures is that so few of them resemble human milk, the presumable prototype of an infant's food, in respect to the relative proportions of protein, fat and carbohydrate. Powers observed that human milk stands apart from the commonly used infant feedings more conspicuously than does cow's milk, in spite of the endeavor of pediatricians to approach the one and to flee from the other. All the common mixtures, as well as both human and cow's milk, fall into a few well defined groups, so that from the standpoint of the relative proportions of the various nutrients "a host of apparently dissimilar milk mixtures have lost an artificial individuality." The mixtures that experience has shown to be particularly successful in feeding infants fall into a majority group that approaches the caloric percentage pattern of the food mixtures in the sweetened condensed milk group; about 60 per cent. of the total calories are in whole milk, and 40 per cent. in added carbohydrate. In other words, when the multitude of milk mixtures commonly used in infant feeding are reduced to the caloric percentage formulation, it is perceived that many of them are essentially alike or identical, excepting in concentration, degree of denaturization by cooking or souring, and qualitative differences in protein, carbohydrate, fat and salts. In comparing the numerous formulas studied, Powers remarks:

> The milk mixtures which conform to the caloric percentage distributions of the majority and sweetened condensed milk groups are widely used, because experience has shown that most infants thrive on one or another of them. If one mixture in the group does not seem satisfactory, then another mixture is tried and perhaps still another and probably, finally, sweetened condensed milk itself. Physicians little realize that these mixtures differ but little from one another, except in the amount of dilution and degree of cooking. It is an astonishing fact that one-third strength cow's milk with 5 per cent. sugar—a mixture universally used in infant feeding and regarded as orthodox by pediatricians of all schools—differs from sweetened condensed milk as it comes from the can only in degree of dilution and extent of denaturization by cooking and storage. On no mixtures in the other groups discussed have large numbers of average infants been fed successfully for considerable lengths of time.

1. Rose, M. S.: Feeding the Family, New York, The Macmillan Company, 1924.
2. McCollum, E. V., and Simmonds, Nina: The Newer Knowledge of Nutrition, Ed. 3, New York, The Macmillan Company, 1925.
3. Powers, G. F.: Comparison and Interpretation on a Caloric Basis of the Milk Mixtures Used in Infant Feeding, Am. J. Dis. Child. 30: 453 (Oct.) 1925.

Many supposedly different infant foods are essentially similar, except with respect to their water content. Dilution is doubtless a disadvantage in some cases; in others, it seems to promote utilization. In any event, the infant's requirement of water may well be considered by itself rather than as a feature of the proportion of the food ingredients.

THE MEASUREMENT OF BASAL METABOLISM

The subject of basal metabolism—the energy production of man during complete muscular repose and in the fasting state—has of late been brought "out of the realm of pure physiology into the domain of clinical medicine." Reference to calorimetry in medicine no longer is disconcerting to the general practitioner. Incompetent though he may be to deal with the technical details of the measurements, he has become aware of the help that a knowledge of his patients' fundamental energy exchange may furnish in the diagnosis of certain disorders and in the interpretation of his therapeutic ventures in relation to them. The physician should assure himself, however, that the technic of the estimations of basal metabolism in his patients is adequate and dependable. A medical writer [1] has recently remarked that there is a tendency in some hospitals at present to turn over the management of the metabolism laboratory to a technician who has had no training in medicine or in the science of nutrition. Such persons often do well in metabolism work just as do technicians in roentgen-ray diagnosis or bacteriology. On the other hand, they can scarcely be blamed if they get far off the track and make disastrous errors. They may be excellent in their technic, he adds, but the management of experiments and the interpretation of results in patients should be in the hands of a clinician who has made some special study of metabolism. This man should be thoroughly familiar with the technic himself, as it is only in this manner that he can be on guard against all the possible errors.

Even the expert is beset with uncertainties. Benedict [2] believes that knowledge of the extent to which body temperature, skin temperature, exposure to a cold environment, sleepiness and psychic unrest may affect basal metabolism is as yet too uncertain. With respect to some of them, he has lately furnished helpful information by the demonstration that prolonged rest in a hospital bed, prior to basal metabolism measurements in the morning, is seemingly no longer justified. This conclusion is the outcome of studies in which the influence on basal metabolism of varying periods of repose and exposure to weather was considered. In the case of normal persons, at least, the exercise of rising, bathing, dressing, walking and mounting several flights of stairs is without influence on the basal metabolism on any certain day, provided the usual rest period of one-half hour is insisted on.

Benedict has pointed out that, to obtain the needed repose prior to the measurements, two methods are in use. Many physicians require patients to come to the hospital in the evening and sleep during the night in a hospital bed. Numerous laboratories and clinics ordinarily permit patients to come to the laboratory from their homes in the morning. In the latter instance, the journey to the laboratory involves varying amounts of exercise and exposure, but in such cases a thirty minute period of complete muscular repose, with the subject lying on a comfortable bed or couch, well clothed and lightly covered, is usually and should always be insisted on. The overnight hospital regimen no longer seems to be requisite. It is true that the exposure incident to the migration from home to the metabolic laboratory is likely to bring about great changes in skin temperature, usually with a consequent lowering of the temperature of the peripheral tissues. But, according to Benedict's observations, at least under conditions in which excessive chilling or shivering is not induced, the heat production is entirely independent of the transitory heat loss, for there may be large amounts of heat either stored in or lost from the peripheral tissues without reaction on the actual heat production. The problem of the clinical measurement of basal metabolism thus becomes somewhat simplified.

1. Du Bois, E. F.: Basal Metabolism in Health and Disease, Philadelphia, Lea & Febiger, 1924.
2. Benedict, F. G., and Crofts, E. E.: The Fixity of Basal Metabolism, Proc. Nat. Acad. Sc. 11: 585 (Oct. 15) 1925.

FUNCTIONAL TESTS FOR GASTRIC SECRETION

More than half a century has elapsed since Kussmaul, in 1867, demonstrated the value of the stomach tube in clinical work. The older method of examination in which the gastric contents were withdrawn entirely at the end of an interval during which the test meal remained in the stomach has gradually been replaced in many quarters by fractional withdrawal. In this, gastro-enterologists have followed, in particular, the lead of Rehfuss of Philadelphia. The use of the roentgen rays and their more direct visual application to the examination of the stomach have tended to decrease the practice of chemical gastric analysis. In reviewing his own experience with the method of fractional gastric analysis, Larimore [1] of the Washington University Medical School in St. Louis concludes that if the procedures are well standardized the technic affords valuable data on gastric secretion. It does demonstrate, he states, alterations in gastric secretion and motility that are more or less directly diagnostic and helpful therapeutically. The demonstration of an achlorhydria is prompt and conclusive. The extent to which the data developed by this

1. Larimore, J. W.: Gastric Analysis, J. Lab. & Clin. Med. 11: 1 (Oct.) 1925.

method of gastric analysis may be diagnostically or therapeutically useful is more limited than has been claimed for practical deductions from analogous data in the past. Larimore adds that gastric analysis cannot be discarded as being altogether superseded or replaced by newer methods of gastro-intestinal examination. The examination of the fasting contents of the stomach is essential to gastro-intestinal diagnosis, and the observation of the curve of the gastric acidities by the slow fractional method may give useful and necessary information. Knowledge of the gastric acidities, he concludes, has been of the greatest help in selecting a diet, especially with a consideration of the buffer values of various foods.

It should be remembered, however, that studies of the normal stomach have shown gradations from achylia to so-called hyperacidity. Rehfuss [2] has remarked that studies of healthy men indicate that "there is no acidity in disease which cannot be encountered in health." Such circumstances have led Carlson [3] to insist that the clinician must henceforth take cognizance of the fact that hypersecretion and clinical hyperacidity as well as hypo-acidity and anacidity not only are compatible with health, but are found in a considerable percentage of normal individuals.

In the ordinary gastric functional tests, the provocatives to secretion consist of the direct mechanical effect of the meal, of psychic influences related to its ingestion, or of chemical secretagogues present in or derived from the food. Other substances, however, may also bring about functioning of the secretory cells of the stomach mucosa. It is readily conceivable that if such stimulants could be administered in standardized ways, important information might be elicited in regard to the secretory capacity of the glands. Gompertz and Vorhaus [4] have secured new evidence that histamin, injected subcutaneously, stimulates the flow of gastric juice in man. Doses of 1 mg. of histamin hydrochlorid are effective in this respect and apparently harmless. By the use of this test they were able to differentiate between true and "apparent" achylia gastrica. The possibility of distinguishing between organic and functional causes of suppressed secretion at once suggests itself. At any rate, Gompertz and Vorhaus have not found any other test that will permit equally satisfactory diagnosis of the capacity of the gastric glands to secrete "free" hydrochloric acid. The histamin test may be of assistance in the early diagnosis of pyloric carcinoma. Whether the drug offers possibilities as a therapeutic agent in conditions of diminished digestive function cannot yet be predicted.

2. Rehfuss, M. A.: Possibilities of Fractional Gastric Analysis, J. A. M. A. **71**: 1534 (Nov. 9) 1918.
3. Carlson, A. J.: The Secretion of Gastric Juice in Health and Disease, Physiol. Rev. **3**: 1 (Jan.) 1923.
4. Gompertz, L. M., and Vorhaus, M. G.: Studies on the Action of Histamine on Human Gastric Secretion, J. Lab. & Clin. Med. **11**: 14 (Oct.) 1925.

SKIN TEMPERATURE AND HEAT LOSS

The physician has come to regard the temperature of the body as a manifestation exhibiting such constancy in health that he can depend on deviations from the normal records to furnish evidence of disease. He concludes that heat production and heat loss are so perfectly regulated under normal physiologic conditions as to maintain a practically constant body temperature. This is generally considered to be 98.6 F., but there are fluctuations from this average which, with the ordinary person, may amount to 2 degrees Fahrenheit in twenty-four hours, the minimum temperature occurring at about 4 a. m. and the maximum about 5 p. m. under conditions of repose, with higher temperatures during severe muscular work. Benedict [1] has reminded us that as an indication of the presence or absence of fever, the temperature taken in any of the usual localities is perfectly satisfactory, but as a means of studying the total heat stored in the body such temperature records are deceptive. The temperature in the mouth, axilla or groin, for instance, is almost invariably somewhat lower than that in the rectum. Thus, a gradient exists between the temperature deep in the trunk and the temperature near the surface of the body. This gradient has been studied, and it has been found that between the temperature deep in the trunk and that 1 cm. from the orifice of the rectum or vagina there is a difference of from 2 to 3 degrees Centigrade.[2]

As might be expected, the temperature of the skin is somewhat lower than that of the interior. In studies made at the nutrition laboratory of the Carnegie Institution of Washington in Boston,[3] the actual temperatures have been found to vary with that of the surrounding air, the movement of the air, the character of the clothing worn, and other environmental factors, but observations show further that even under uniform conditions the temperatures of different parts of the skin are by no means the same. Thus, the body when unclothed at an outside temperature of 14.6 C. (58.3 F.) showed a skin temperature at the waist and chest of 30 C. (86 F.), while at the ankle it was only 20 C. (68 F.). Evidently the loss of heat from the skin is not always equally compensated in different areas.

These regional differences in body temperature tend to disappear when adequate protective covering is furnished, whereby a person provides himself with a layer of warm air—his "private climate." Thus, after a long sojourn under bedclothing, there tends to be a fairly equable temperature about the abdomen and trunk, with a tendency for the extremities to be somewhat cooler as the distance from the trunk increases. Under the ordinary conditions of dress,

1. Benedict, F. G.: Skin Temperature and Heat Loss, Proc. Nat. Acad. Sc. **11**: 549 (Sept.) 1925.
2. Benedict, F. G., and Slack, E. P.: Carnegie Inst. Washington Pub. No. 155, 1911.
3. Benedict, F. G.: Miles, W. R., and Johnson, A.: Proc. Nat. Acad. Sc. **5**: 218, 1919.

however, Benedict's temperature surveys show invariably a distinct correlation between the skin temperature and the temperature of the exterior, this correlation being noted even in the well protected parts of the trunk. Thus, on a cold day the entire trunk may have a skin temperature as low as 31 C. (87.8 F.), with the temperature of the legs and feet falling off to not far from 24 to 25 C. (75.2 to 77 F.).

These studies on skin temperatures in relation to the environment leave little doubt that the loss of heat through radiation is an important factor in the heat regulation of the organism. Of course, heat is also lost by the vaporization of water through the lungs and skin, approximately from one third to one quarter leaving through the skin. In a person engaged in severe exercise with an output in excess of 7,000 calories daily, Benedict found that essentially one half was lost by the vaporization of water, while more than 3,600 calories was removed from the body by direct radiation. He has reached the conviction that, except under extreme conditions, heat production and heat loss are two essentially independent processes. According to Benedict, considerable fluctuations in the heat stored in or lost from the body are possible, resulting in rather profound changes in the temperature of the peripheral tissues without appreciable alteration in heat production. This presents a somewhat new point of view in the consideration of the body's heat control.

Current Comment

EFFECT OF IRRADIATED TUMOR TISSUE

For some years it has been urged that inoculation of animals with certain types of live tumor tissue renders the animal resistant to further inoculation of tumor substance, provided the first tissue inoculation resulted in a "take" with ultimate regression. Investigators, therefore, have reasoned that tumor tissue, of which the virulence had been decreased by exposure to the roentgen ray, when implanted into animals might protect against further inoculation by the same tumor, and, on the other hand, that the growth of already implanted tumor substance might be checked by subsequent inoculation of irradiated tissue. Experiments tended to confirm them in the belief that such protective and curative effect could be produced in the manner outlined. Francis Carter Wood and Rosa E. Prigosen,[1] however, thought that the experiments were not conclusive for the reasons that too few animals and too few types of tumors had been used, some of the tumors used were self-immunizing, and not enough allowance had been made for natural immunity in the animals. Therefore, they repeated the experiments of their predecessors on a large scale, using many white mice and rats and a variety of tumors. The data secured from some 6,000 experimental inoculations and more than 30,000 control stock inoculations seem to them to furnish considerable evidence against the assumption either that immunity to inoculation or resistance to a growing mouse or rat tumor can be induced by the inoculation of irradiated tumor material. Similar conclusions are repeated in two articles, published at the same time, by Small, Evans and Krumbhaar,[2] who found that the growth of established rat sarcoma No. 10 was affected neither by a single injection nor by three injections at weekly intervals of homologous tissue cells that had been devitalized by exposure to roentgen ray. Wood and Prigosen reach finally the following practical conclusions:

> If no such immunity can be produced in animals, the experimentation on human beings should be abandoned immediately as not only useless but dangerous and wholly unjustifiable from a scientific point of view.

NASAL SENSITIZATION IN BRONCHIAL ASTHMA

Appreciation of the varied clinical manifestations of hypersensitiveness to foreign substances in the body has grown more rapidly than exact knowledge in regard to its scientific aspects. Yet it is only on the basis of the latter that any truly rational management of the anaphylactic features of asthma and allied disorders can be formulated. Reviewing the subject from a broad point of view, Longcope[3] of the Johns Hopkins Hospital regards it as apparent that hypersensitiveness shown by different people to pollens, animal emanations, foods, drugs, and possibly bacteria, is dependent on a common pathologic state. The symptoms, it is true, arising from this state of hypersensitiveness may vary in different patients, for in one person they may indicate involvement of the respiratory tract, in another, of the gastro-intestinal tract, or in a third, some disorder of the skin; but, on the other hand, in many reported instances of hay-fever or asthma, gastro-intestinal disturbances and skin eruptions have appeared simultaneously or alternately in the same individual, and so far no arguments have been adduced to lead one to believe that the fundamental alterations in the tissues of the patient who suffers from hay-fever due to ragweed are essentially different from those of a similarly hypersensitive patient who suffers from urticaria or gastro-intestinal disturbances from eating eggs. As a matter of fact, Longcope adds, the ingestion of a single food, such as eggs, may cause in the same person or in different persons such varied symptoms as urticaria, eczema, asthma and gastro-intestinal disturbances. There has been no agreement as to the mode of sensitization of otherwise healthy persons to foreign proteins. The sound skin offers little likelihood of invasion; hence the nasopharynx, the respiratory tract and the alimentary tract present themselves as additional possibilities. Selecting a material, horse dander, that is now regarded as definitely anaphylacto-

1. Wood, F. C., and Prigosen, Rosa E.: No Immunity Produced by Inoculating Irradiated Tumor Tissue, J. Cancer Research **9**: 287 (Sept.) 1925.

2. Small, J. C.; Evans, Mary J., and Krumbhaar, E. B.: Studies in Biological Reaistance to Malignant Tumors, III and IV, J. Cancer Research **9**: 316, 323 (Sept.) 1925.

3. Longcope, W. T.: Anti-Anaphylaxis and Desensitization, Physiol. Rev. **3**: 240 (April) 1923.

genic,[4] Ratner, Jackson and Gruehl[5] seem to have demonstrated that sensitization, anaphylactic phenomena and even anaphylactic death can be secured when the nasal route is the avenue of entrance of the foreign product. Feeding the horse dander was without effect. Their tests were made on the guinea-pig, a species notably susceptible to small doses of foreign protein. Nevertheless, such striking phenomena corroborative of the observations of various earlier investigators call attention anew to the desirability of keeping in mind the nasal membrane as a portal of entry of noxious products in the mechanism of bronchial asthma in man.

Association News

MEETING OF BOARD OF TRUSTEES

Abstract of the Minutes of a Meeting of the Board of Trustees of the American Medical Association, Held at Association Headquarters, Thursday and Friday, Nov. 19 and 20, 1925

All members of the Board, including the President, President-Elect and Speaker of the House of Delegates, were present.

COOPERATION WITH THE PROHIBITION DIRECTOR AND THE TREASURY DEPARTMENT

Dr. W. H. Mayer, chairman of the committee appointed by the Board of Trustees, at the direction of the House of Delegates, to cooperate with the Commissioner of Internal Revenue and the Secretary of the Treasury in the formulation of regulations under the National Prohibition Act, appeared before the Board. He presented principles formulated by the committee with a view to their incorporation in regulations to be suggested to the Commissioner of Internal Revenue. The principles embodied in the report of the committee dealing with the dispensing of liquors for medical purposes and with the assumed regulation of the practice of medicine by Congress were approved by the Board of Trustees.

RESEARCH FELLOWSHIPS

At the November meeting, the Board of Trustees referred to the Committee on Scientific Research a proposal for the establishment of research fellowships. Dr. Ludvig Hektoen, chairman, presented the report of the committee, approving in general the proposed establishment of such fellowships, provided adequate control of appointments and of the work of the appointees can be maintained. It was pointed out in the report of the committee that many such fellowships have already been established by other organizations. The matter was referred back to the Committee on Scientific Research for further study, and the committee was asked to report at a later meeting of the Board, offering suggestions as to the required machinery for carrying out the project.

GENERAL MANAGER'S REPORT

The General Manager of the Association reported to the Board on the business affairs of the Association, the status of its publications, and the work of various departments.

HYGEIA

The report of the General Manager showed that the circulation of *Hygeia* had been materially increased during the year, and that the financial position of the magazine is much stronger than ever before. *Hygeia* seems to be gaining favor with the general public, as well as with the medical profession. After full discussion, the Board of Trustees authorized the continuance of the policy and plans under which *Hygeia* has been published during the past year, and directed that Dr. Morris Fishbein, Editor of THE JOURNAL, shall also be Managing Editor of *Hygeia*, with Miss Jane Pine as associate editor, and that Drs. John M. Dodson, Arthur J. Cramp and Olin West shall serve as members of the advisory editorial board.

ENLARGEMENT OF ABSTRACT DEPARTMENT

The Board considered suggestions offered by the Editor of THE JOURNAL, for the enlargement of the abstract department of the Association, with a view to extending the scope of abstracts now published in the Association's journals and to the possible development of a comprehensive abstract service for individual physicians. Authorization was given for working out plans for the enlargement of the abstract department.

REDUCTION OF FEDERAL TAXES

Dr. Charles W. Richardson reported that he and Dr. W. C. Woodward, a committee appointed by the Board of Trustees to appear before the Ways and Means Committee of the House of Representatives had received a very satisfactory hearing, and that that committee would recommend to the House that the Harrison Narcotic tax be reduced from $3 to $1.

MANUAL OF PERIODIC PHYSICAL EXAMINATIONS

The General Manager reported to the Board that the manual on periodic physical examinations, prepared by a special committee, had been issued since the last meeting, and that several constituent state associations have ordered, through the Bureau of Health and Public Instruction, a sufficient number of copies of this manual to supply one to each of their members. The manual is furnished to state associations at cost.

NEWSPAPER PUBLICITY

Newspaper clippings forwarded to the Secretary of the Association, accompanied with vigorous complaints, were presented to the Board of Trustees. These dealt with statements alleged to have been made in papers presented before medical organizations, which were believed to reflect unfavorably on the medical profession at large. The Board appointed a committee to confer with the officers of the organizations at whose meetings these statements are alleged to have been made, in an endeavor to prevent the publication of similar statements in the future.

COMMITTEE ON SCIENTIFIC EXHIBIT

Dr. D. Chester Brown, chairman of the committee, presented the report of that committee, in which were discussed plans for the Scientific Exhibit at the Dallas Session.

PROTECTION OF MEDICAL RESEARCH

A report was presented from Dr. W. B. Cannon, which briefly reviewed the work of the Committee on the Protection of Medical Research since its appointment, and in which he tendered his resignation as chairman of the committee. Dr. Cannon's resignation was accepted by the Board with regret, to take effect in February, and the Secretary was instructed to express to Dr. Cannon the gratitude of the Board of Trustees for the splendid service that he has rendered over a long period of years in directing the work of this important committee.

REPORT OF SPECIAL COMMITTEE ON NATIONAL HEALTH COUNCIL

The special committee of the Board of Trustees composed of Drs. A. R. Mitchell, Charles W. Richardson and J. H. Walsh, to which was referred a proposal of the National Health Council, seeking active affiliation of the American Medical Association with that council, offered its report The committee recommended that the Board of Trustees invite the directors of the National Health Council to submit a definite proposal relative to active affiliation of the American Medical Association with the council "that would insure the American Medical Association a legitimate representation in the directorate of the National Health Council in proportion to the membership and the influence of the American

4. Ratner, B.; Jackson, H. C., and Gruehl, H. L.: The Anaphylactogenic Character of Horse Dander and Its Crossed Relationship to Horse Serum, Proc. Soc. Exper. Biol. & Med. **23**: 16 (Oct.) 1925.

5. Ratner, B.; Jackson, H. C., and Gruehl, H. L.: Nasal Sensitization, Nasal Anaphylactic Shock and Respiratory Symptoms Simulating Bronchial Asthma, in the Guinea-Pig, Proc. Soc. Exper. Biol. & Med. **23**: 17 (Oct.) 1925.

Medical Association in public health affairs." The Board of Trustees approved these recommendations of the committee.

GORGAS MEMORIAL INSTITUTE OF TROPICAL AND PREVENTIVE MEDICINE, INCORPORATED

A special committee appointed by the Board at its November meeting to consider a proposal submitted to the Board of Trustees by the chairman of the board of directors of the Gorgas Memorial Institute of Tropical and Preventive Medicine, Incorporated, presented its report. The proposal submitted to the Board of Trustees involved the appointment of three officers of the American Medical Association to serve as "related" directors of the Gorgas Memorial Institute of Tropical and Preventive Medicine, Incorporated, and the active affiliation, through such representation, of the American Medical Association with the Gorgas Memorial Institute as now constituted. The report of the committee was adverse to the acceptance of this proposal, and the recommendations of the committee were adopted by the Board of Trustees.

A special committee, composed of Drs. W. D. Haggard, D. Chester Brown, E. H. Cary, J. H. J. Upham and J. H. Walsh, with Drs. E. B. Heckel, chairman of the Board of Trustees, and Dr. Olin West, Secretary and General Manager, as ex-officio members, was appointed to consider and report on proposals similar to those of the National Health Council and the Gorgas Memorial Institute of Tropical and Preventive Medicine, Incorporated, which may be submitted in the future.

After the transaction of a large amount of routine business, the Board of Trustees adjourned until its regular annual meeting on the third Friday of February, 1926.

ANNUAL CONFERENCE OF SECRETARIES OF CONSTITUENT STATE MEDICAL ASSOCIATIONS

The regular Annual Conference of Secretaries of Constituent State Medical Associations was held at the American Medical Association headquarters, Chicago, November 20-21. Thirty-nine secretaries, assistant secretaries and executive secretaries were in attendance, and the editors of eleven state medical journals, who are not secretaries, were also present at the conference, which was attended by the general officers and Board of Trustees of the Association and others interested. The proceedings of this conference will be published in the *American Medical Association Bulletin*, beginning with the December number.

THE DALLAS SESSION

Scientific Exhibit

The Scientific Exhibit will be located in the Manufacturers' Building of the State Fair Grounds; in this building will also be housed the registration bureau, technical exhibits, motion picture theater and six section halls.

The Committee on Scientific Exhibit is desirous that the exhibits shall be presented in a way that will emphasize their scientific value. This may be done by carefully worded explanatory placards, but particularly by personal demonstration. (The committee requires that all booths shall be in charge of a competent demonstrator.) Also it should be remembered that the general attractiveness of the exhibit is essential; the committee will do its part by having the booths decorated appropriately. The total amount of space available for exhibit purposes is approximately the same as that of last year (10,000 square feet). From the interest already manifested in the next Scientific Exhibit, it is evident that large blocks of space cannot be assigned to individual exhibitors.

A fully equipped motion picture theater for talks illustrated with lantern slides and motion pictures will be an adjunct of the Scientific Exhibit. It will be located on the same floor, adjacent to the exhibit. Unless there are exceptional reasons, the length of the periods will be limited to two quarters (one-half hour).

Application blanks for the exhibit or the motion picture theater may be obtained by sending requests for them to Director, Scientific Exhibit, 535 North Dearborn Street, Chicago.

The committee will make no assignments previous to February 15, in order that the amount of space available may be apportioned to the best advantage to all concerned. All applications must be received before this date.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

ALABAMA

Chiropractor Loses Appeal.—The court of appeals, Montgomery, November 11, upheld the Dallas circuit court in the conviction of J. A. Robinson, a chiropractor, Selma, on a charge of practicing without a license.

Health Officer Appointed.—The board of health of Houston County has appointed Dr. Lewis Roy Poole full-time county health officer to succeed Dr. Thomas E. Tucker, who resigned to accept a similar position in North Carolina.——Dr. Harold P. F. Burbage, Charleston, S. C., has been elected full-time health officer of Jackson County.

CALIFORNIA

Lectures on Physiology.—Dr. Henry Sewall, emeritus professor of medicine, University of Colorado School of Medicine, Denver, will give a series of six lectures for the San Diego Medical Lectureship Fund, San Diego, beginning Jan. 4, 1926, on "Physiology," which will pertain chiefly to the metabolism of respiration and the endocrines. The lectureship fund has been raised among members of the San Diego County Medical Society.

"Dr." Kramolin Pleads Guilty.—The Sacramento *Bee*, October 15, relates that a "Dr." William Kramolin pleaded guilty, October 14, to charges of embezzlement and theft of a platinum dish from the laboratory of the University of Nevada and that the penalty ranged from two to ten years in the state penitentiary. Kramolin is said to have represented that he was connected with a local hospital and pretended that he was to perform experiments. Previous reports state that Kramolin was arrested, December 30, 1921, on a charge of violating the medical practice act.

Popular Medical Lectures.—Stanford University School of Medicine announces the forty-fourth course of popular medical lectures, to be given at Lane Hall on alternate Friday evenings. Dr. Harold K. Faber will speak on "Dietary Peculiarities of Children," Jan. 8, 1926; Dr. Harry E. Alderson, "Skin Disturbances from Foods and Drugs," January 22; Dr. Hans Lisser, "Ductless Glands and Obesity," February 5; Dr. Philip K. Brown, "Gastro-Intestinal Disturbances and Nutrition," February 19; Prof. Ernest G. Martin, Ph.D., "Fatigue and Rest," March 5, and Dr. George E. Ebright, president, California State Board of Health, "On the Prevention of Disease," March 19.

COLORADO

Community Health Conference.—Under the auspices of the University of Colorado, the Child Welfare Bureau, State Board of Health, State Tuberculosis Association, State Dental Association and the State Psychopathic Hospital, and with the cooperation of local physicians, dentists and committees, a community health conference was held, November 13, in Greeley, financed by the County Public Health Association and the Red Cross. A complete history of each child patient was taken and physical examinations made. Members of the staffs of the state institutions gave addresses in the evening on health problems. The cooperating organizations had a schedule for other conferences to be held at Johnstown, New Raymer, Fort Lupton and Nunn the following week.

CONNECTICUT

The Tuberculosis Death Rate.—In announcing the annual sale of Christmas seals, the state department of health gives the average tuberculosis death rate in Connecticut by five-year periods for the last thirty years. It was 171.4 per hundred thousand population for the period 1895-1899, and

there was a gradual reduction to 95.4 for the period 1920-1924. Whereas tuberculosis formerly was "the captain of the Men of Death," its death rate in 1924, which was 81.4, was less than that for cancer, which was 104.2 and for pneumonia, which was 100.4.

GEORGIA

Increase in Death Rate.—The Department of Commerce anounces that the 1924 death rate for Georgia was 1,149 per 100,000 population as compared with 1,127 in 1923. The increase is accounted for largely by increases in the death rates from heart disease, pneumonia, whooping cough, measles and arthritis.

Society News.—Dr. Edward C. Davis, Atlanta, addressed the Fulton County Medical Society recently on "Medical Ethics," and Hon. Clark Howell on "A Layman's Point of View of the Medical Profession." Dr. Cyrus W. Strickler addressed the October meeting of the society on "Arteriosclerosis."——Dr. Charles H. Ferguson presented a case of Mongolian idiocy before the Thomas County Medical Society, October 15.——Dr. Charles E. Dowman addressed the Atlanta Neurological Society recently on "Typical and Atypical Facial Neuralgias."

Inadequate Funds for Health Work.—The Ware County Medical Society has passed a resolution requesting the governor to increase the appropriation for the state board of health for the next two years in case there is an extra session of the legislature. The state commissioner of health writes in the *Journal of the Medical Association of Georgia* that a new half million dollar tuberculosis sanatorium, for which the legislature did not increase the appropriation for maintenance for 1926 and allowed only $100,000 for 1927, will have to remain vacant next year and be maintained at about half capacity the following year. With an adequate appropriation, the new institution would have permitted the use of the old building for the care of negro patients. Another correspondent writes that the appropriation for health work remains the same as it has been for the last six years, that the appropriation of $35,000 a year for the school for the feebleminded at Gracewood is inadequate, that the free distribution of arsphenamin has been discontinued, and that the bill to make it lawful for counties to pay for gathering vital statistics failed to pass the legislature.

ILLINOIS

Conference on Heating the Home.—The National Warm Air Heating and Ventilating Association held a conference at the University of Illinois, Urbana, December 2, to discuss the results of years of research on the proper heating of the home as it applies to health. The research work has been conducted in a residence built by the association at Urbana.

Society Conducts Health Column.—The St. Clair County Medical Society voted unanimously, November 12, to cooperate with the East St. Louis *Journal* in conducting a daily health column. Articles will be prepared for publication in that newspaper by members of the medical society, and questions on health will be answered. A committee was appointed to decide on a policy with regard to the column. The members are Drs. Henry A. Cables, Royal Tharp and John H. Fulgham.

Warning—Hard Luck Story.—A man about 45 years of age, bald, heavy set, smooth faced and mild mannered, called on a physician in the vicinity of Mount Vernon, claiming to be traveling for a land company in New Orleans and to have an option on land in another part of the state. He is just waiting around to close the deal and so he ran down here to get his mail, leaving his baggage and other things at the hotel in a nearby town. He exhibits a large curved scar on the left side of his head and says that he was hurt elsewhere a few days ago. He anticipates moving "to this city shortly" and wants enough money to get back to "Decatur" to close the land deal the next day. He makes an appeal that is difficult to refuse, and in at least one case failed to return the money as he promised to do.

Chicago

Hospital News.—The American Hospital of Chicago, at Irving Park Boulevard and Broadway, has broken ground for the erection of a four-story, fireproof addition.

Regional Planning Association.—At the third annual meeting of the Chicago Regional Planning Association, December 2-3, Hotel Sherman, the Wednesday afternoon program was "Public Health," at which Senior Surgeon Claude C. Pierce, U. S. Public Health Service, presided and gave an address on "Coordinated Health Work in the Chicago Region." Among other speakers were Dr. Isaac D. Rawlings, state health officer; Dr. Cornelius A. Harper, state health officer of Wisconsin; Dr. William F. King, state health officer of Indiana; Dr. Herman N. Bundesen, city commissioner of health; Dr. William A. Evans, and Dr. Milton M. Portis.

Typhoid Fever in Chicago.—The Chicago Department of Health reports that there were seventy-nine true cases of typhoid fever in the city in the three months ending September 30, which is ten less than was reported in the corresponding quarter last year. Ten of these patients died, making a case mortality rate of about 16.4 per cent. Five of the fatal cases were apparently due to typhoid carriers. In all, the infections in thirty-eight of the cases reported were traced; thirty-one of them were apparently acquired out of town and twenty other cases are suspected of having been out of town infections. There were on record, September 30, in the Chicago Health Department, thirty-nine known typhoid carriers.

Society News.—Among others, Dr. William T. Belfield addressed the Chicago Urological Society, November 24, on "Pelvic Cellulitis in the Male."——Dr. Francis L. Lederer addressed the Chicago Society of Anesthetists, November 27, on "Impression of Europe."——The Illinois Society of Industrial Medicine and Surgery and the Chicago Society of Industrial Medicine and Surgery will hold a joint meeting, December 7-8, at the Great Northern Hotel. There will be a clinic at 9 o'clock the first day at St. Luke's Hospital, at the same hour the second day at the West Side Hospital, and in the afternoon at Cook County Hospital, and an informal banquet in the evening, to which the ladies are invited; $2.50 per plate.——Dr. Vittorio Putti, Bologna, Italy, held an informal clinic under the auspices of the Chicago Surgical Society at the Cook County Hospital, November 21.——Dr. Arthur Dean Bevan addressed the Chicago Medical Society, December 2, on "Ulcer and Carcinoma of the Stomach and Duodenum—Their Recognition and Surgical Management," and Dr. Karl A. Meyer, on "Complications of Peptic Ulcer and Their Surgical Treatment."——Dr. Alfred Lewy will address the Chicago Laryngological and Otological Society, December 7, Great Northern Hotel, on "Specimens of Ragweed of the Chicago Area," and Dr. Austin A. Hayden on "Cervical Emphysema Following Tonsillectomy."——The Chicago Surgical Society met, December 4, at the Cook County Hospital following a dinner and symposium at the University Club on "Carcinoma of the Large Bowel," participated in by Drs. Vernon C. David, Carl B. Davis and Arthur Dean Bevan.——Prof. L. Koeppe of the University of Halle will address the Chicago Ophthalmological Society, December 22, Hotel Sherman, on "The Importance of Einstein's Theory of Relativity and Gravitation for the Physiologic Color Perception of the Living Eye."——The next meeting of the Chicago Tuberculosis Society will be December 10, at the Brevoort Hotel. Dr. Allen Craig will discuss "Teaching of Tuberculosis for the Profession, Students and the Public," illustrated by moving pictures.

INDIANA

Mental Health Conference.—The tenth annual conference on mental health will be held in Indianapolis, December 7, under the auspices of the State Society for Mental Hygiene. The presiding officers at the various sessions will be H. W. Sherwood, state superintendent of public instruction; Samuel E. Smith, provost of Indiana University, and State Senator C. O. Holmes, Gary. The subjects for discussion include backward children in the public school, mental clinics, special classes for backward children and special training for teachers. Among the speakers will be Dr. Charles P. Emerson, dean, Indiana University School of Medicine; Dr. Charles Bernstein, superintendent, State School for the Feeble-Minded, Rome, N. Y., and Dr. Max A. Bahr, superintendent, Central Hospital for Insane.

Society News.—Elmer V. McCollum, Sc.D. of the Johns Hopkins University School of Hygiene and Public Health, addressed recently a joint meeting of the Indianapolis Medical Society, Indianapolis Dental Society, Indiana Dental School, Public Health Nursing Association, State School of Medicine and National Dairy Association.——Dr. Edward L. Keyes, professor of clinical surgery, department of urology, Cornell University School of Medicine, New York, recently addressed the Indianapolis Medical Society on "Renal and Ureteral Stones." Dr. Thomas B. Noble, Jr., addressed the society, October 27, on "Auricular Fibrillation in Toxic

Goiter," and Dr. Horace R. Allen on the "Treatment of Burns."——Members of the Seventh District Medical Society were entertained at a banquet by Dr. Simon P. Scherer at the Highland Sanatorium, Martinsville, October 28. Dr. Bernard J. Larkin was elected president of the society and Dr. Jacob K. Berman, secretary.

LOUISIANA

Personal.—Dr. Khurshedjee J. Rustomjee, assistant British malariologist for the Island of Ceylon, and Dr. Ralph K. Collins of the International Health Board, recently assigned to malaria control in Turkey, addressed the Shreveport Medical Society, Shreveport, November 3, and left for Jackson, Miss., the following day, on a tour of inspection of malaria control work.

Professor of Physiology Appointed.—The dean of Tulane University of Louisiana School of Medicine, New Orleans, announces the appointment of Henry Laurens, Ph.D., associate professor of physiology, Yale University School of Medicine, New Haven, Conn., as professor of physiology to succeed Dr. Walter E. Garrey, who accepted a position last spring at the Vanderbilt University School of Medicine, Nashville, Tenn.

MARYLAND

Award to Dr. Abel.—The Research Corporation of New York has selected Dr. John J. Abel, professor of pharmacology, Johns Hopkins University Medical Department, Baltimore, to receive a $2,500 award for outstanding contributions to science. With the award there is to be a plaque designed by an eminent sculptor.

Dinner to Dr. Dean Lewis.—A dinner in honor of Dr. Dean Lewis, recently appointed professor of surgery at Johns Hopkins and surgeon in chief to the Johns Hopkins Hospital, Baltimore, has been arranged for Jan. 22, 1926. The surgical alumni of Johns Hopkins and leading surgeons from other parts of the country have been invited. There will be a series of clinics, and in the course of these meetings a movement will be started to create an organization to be known as the Johns Hopkins Surgical Society.

Psychopathic Building Opened.—At the semiannual meeting of the Board of Mental Hygiene and the boards of managers of state hospitals for the insane and feebleminded at the state hospital, Crownsville, November 24, the Hugh Young Psychopathic Building was formally opened. Among others, Dr. Clarence Floyd Haviland, chairman, State Hospitals Commission of New York, and president of the American Psychiatric Association, spoke on "The Plan of Development of New York State Hospital." A testimonial was presented by Governor Ritchie to Dr. Young, who has served on the state lunacy commission for seventeen years.

Society News.—Dr. Haven Emerson, professor of public health administration, Columbia University College of Physicians and Surgeons, New York, addressed the Maryland Tuberculosis Association, November 6.——Dr. William H. Welch, director, School of Hygiene and Public Health, Johns Hopkins University, Baltimore, addressed the New York Tuberculosis and Health Conference, Hotel Biltmore, New York, November 20, on the encroachment of the activities of public health officials on the private practice of physicians.——Dr. Arthur P. Herring, state commissioner of mental hygiene, and Dr. Robert P. Winterode, superintendent, Crownsville State Hospital, addressed members of the Social Service Conference who visited the hospital, November 20, on "The Development of State-Wide Mental Hygiene Clinics" and "The Development of This Hospital for the Negro Insane," respectively. The conference was in session at Annapolis, November 18-20.——Dr. Lewellys F. Barker addressed the Baltimore City Medical Society, November 20, on "What the Medical and Chirurgical Faculty Does for Its Members"; Dr. John R. Oliver, on "The Work of a Physician in the Baltimore Court House," and Dr. Charles R. Austrian, on "Some Vascular Episodes Simulating Acute Visceral Disease."——Dr. Alice Hamilton, assistant professor of industrial medicine, Harvard School of Public Health, Boston, gave one of the De Lamar Lectures, November 30, at the Johns Hopkins University School of Hygiene and Public Health on "The Present Status of Industrial Toxicology in the United States."

MASSACHUSETTS

Vaccinated Children Escape Smallpox.—A correspondent notes in the *Boston Medical and Surgical Journal* that, in the recent outbreak of smallpox in the St. Francis Orphanage, Woonsocket, in which there were 240 children, not one of the fourteen victims had even been vaccinated. No children who had ever been vaccinated contracted smallpox although they mingled freely with those affected.

Appointments at Tufts College Medical School.—According to the *Boston Medical and Surgical Journal*, Drs. Frederic L. Good and Alonzo K. Paine have been appointed associate professors of obstetrics at Tufts College Medical School, Boston; Dr. Frank H. Dunbar, assistant professor of pathology; Dr. Edward K. Ellis, assistant professor of ophthalmology; Drs. Edward J. Denning, John F. Fennessey, Joseph E. Hallisey and Joseph M. Lynch, assistant professors of theory and practice of medicine, and Dr. Edwin H. Place, assistant professor of pediatrics.

MICHIGAN

Society News.—Dr. Frederick M. Allen, director, Psychiatric Institute, Morristown, N. J., will address the Wayne County Medical Society, Detroit, December 7, on "Treatment in Pernicious Anemia."

Medical Examiners Reappointed.—Governor Groesbeck has reappointed the following members of the state board of registration in medicine; their terms will expire in 1929: Dr. George L. Lefevre, Sr., Muskegon; Dr. Albertus Nyland, Grand Rapids; Dr. Nelson McLaughlin, Detroit; Dr. Ray C. Stone, Battle Creek, and Dr. Guy L. Connor, Detroit.

Personal.—Dr. Lloyd B. Whitman has been appointed city physician of Ionia to succeed Dr. Wellington B. Huntley.——Dr. Cyrenius G. Darling, president of the state medical association, addressed the Washtenaw County Medical Society, November 10, concerning his forty years' work in the practice of medicine. The society presented Dr. Darling with a bouquet of forty roses.

MISSOURI

Alumni Organize.—Graduates of the Ensworth Medical College organized an alumni association at a meeting at Kansas City, October 7, electing Dr. Charles G. Geiger, St. Joseph, president; Dr. Joseph H. Buckles, Kansas City, Kan., vice president, and Dr. Charles W. Fassett, 115 East Thirty-First Street, Kansas City, Mo., secretary-treasurer. All professors and graduates of the Ensworth, Central and Northwestern colleges of St. Joseph are requested to send their names to the secretary for further information.

The Adcox Confession (Continued).—Arriving in San Francisco, Adcox says in the St. Louis *Star*, he went to the home of the Rev. Dr. Francis R. Cutting in Oakland, to have his fortune told. When the "Reverend Doctor" recovered from his trance, he told Adcox that he should be a missionary and that it would require only a few minutes to take the examination. Five questions were proposed, Adcox's answers being (1) Absolutely, (2) Positively, (3) Undoubtedly, (4) Surely, and (5) Of course. Cutting informed Adcox that he made a passing grade and prepared a "Certificate of Ordination," dated back to Jan. 10, 1909. The certificate, which Adcox still has in his possession, sets forth that he had been ordained by the First Spiritual Church of the City and County of San Francisco by the authority vested in the church by the state of California under Charter 55543, and "authorizes" him "to solemnize marriages, officiate at funerals and perform all other duties." Adcox was given also a "salutem," authorizing him to establish branch churches and missions and to collect funds for their upkeep. Cutting told Adcox that he could obtain certificates for others at $10 each, perhaps not knowing that an "old gentleman" had already offered Adcox $500 for such a degree. Returning to St. Louis, Adcox found a young man "almost desperate" to see him. His story was that he had applied for a license to practice in Minnesota but that he needed two years of premedical training and would give Adcox $600 to fix him up. Adcox telephoned to one of his "assistants," who obtained a certificate guaranteed to stand the "acid test." The applicant hastened to Minneapolis, but the state board refused to accept the certificate. The "assistant" could not, of course, make good his guarantee and would not return the money. The fellow had a wife and two children and was broke. Adcox says he gave him a check for $600.

Helmuth P. Holler, who owned the "Oriental University" in Washington, D. C., and who is said to have sold diplomas conferring more than 600 different degrees, made a contract with Adcox, but transacted little business, as all applicants for dental, legal and other degrees were turned over to a man "who was a magician at changing the worst sort of raw material into a dentist or a lawyer." Adcox says he knows of lawyers and dentists in St. Louis, Boston, New York and

elsewhere who entered their professions in this manner. It seemed now that every chauffeur, street car conductor, photographer and milk wagon driver who met Adcox wanted a diploma. A St. Louis physician, "high in his profession," brought his office girl to Adcox, to whom he offered $1,000 to get her a medical degree. Although Adcox says he refused this offer, he admits that he helped a few women to obtain degrees.

MONTANA

Personal.—Dr. Hazel D. Bonness, Helena, has been elected president of the Montana State Conference of Social and Health Work.——Dr. Ernest B. Downs, formerly connected with the U. S. Indian Service, at the Fort Belknap Agency, Harlem, has resigned and gone to Danville, Ill., to engage in private practice.

NEBRASKA

Another Christmas Gift.—The Omaha-Douglas County Medical Society has sent in 110 subscriptions to *Hygeia* to be presented to the Douglas County schools.

NEW YORK

Society News.—Dr. William G. Turner, orthopedic surgeon to the Royal Victoria Hospital, Montreal, Canada, addressed the Medical Society of the County of Essex, Fort Henry, on surgical conditions of the knee.

Dr. Albritton Appointed Professor of Physiology.—The Siamese government has completed negotiations for Dr. Errett C. Albritton, Buffalo, as professor of physiology at the Chulalongkorn University at Bangkok. Dr. Albritton is a graduate of the University of Missouri and of the Medical Department of Johns Hopkins University, Baltimore, and during 1923 and 1924 was a fellow in medicine of the National Research Council, carrying on his work at Ohio State University, Columbus.

Personal.—Dr. H. J. Hansen of the National Board of Health of Denmark visited the New York State Health Department, October 13-17, to study methods in use in the Division of Vital Statistics.——The state commissioner of health has appointed Drs. George W. Kosmak and Frederick W. Rice, New York, as regional consultants in obstetrics, and Drs. William J. Orr, Buffalo, Arthur W. Benson, Troy, and Hugh Chaplin, Gaylord W. Graves, William R. May and Herbert B. Wilcox, New York, as regional consultants in pediatrics.——Dr. Royal S. Copeland addressed the Homestead Associations at New Orleans on public health work on the occasion of their fifty-second anniversary.

New York City

Third Harvey Lecture.—Dr. Warren H. Lewis, professor of physiologic anatomy, Johns Hopkins University Medical Department, Baltimore, will deliver the third Harvey Society Lecture at the New York Academy of Medicine, December 12, 8:30. The subject will be "On the Origin of Macrophages and Epitheloid Cells from Mononuclear Blood Cells."

Joint Meeting on Trachoma.—The National Committee for the Prevention of Blindness and the Eastern Association of Indian Affairs, Inc., held a joint meeting at the Russell Sage Foundation Building, December 2. The subject was "The Campaign Against Trachoma Among the Indians." Dr. Anthony J. Lanza, director, National Health Council, presided.

Dr. Fox Appointed Professor of Dermatology.—The appointment of Dr. Howard Fox as professor of dermatology and syphilology at New York University and Bellevue Hospital Medical College was announced, November 28. Dr. Fox, who will succeed the late Dr. William B. Trimble, is attending dermatologist at the Willard Parker, Harlem, Riverside and Lenox Hill hospitals.

Dinner to Dr. Dannreuther.—Friends of Dr. Walter T. Dannreuther, professor of gynecology, New York Post-Graduate Hospital, gave a dinner in his honor, November 23, at the Ritz-Carlton; Dr. Charles Gordon Heyd presided, and Drs. John O. Polak and Samuel W. Bandler gave addresses. Dr. Dannreuther is to be head of the department of gynecology at the Cranleigh Hospital, which is now under construction.

Illegal Practitioner Held.—"Dr. Samuel Marder" was tried in the magistrate's court at Far Rockaway, October 15, for practicing medicine without a license and held in $1,000 bail for trial in the court of special sessions, Queens County. Marder is said to have responded to a call for a physician and to have sent the patient's husband a bill for $5 for "professional services." There is a Samuel A. Marder licensed as a chiropodist in the county; he is not a doctor of medicine.

Annual Dinner of Medical Club.—The Baltimore Medical Club, New York, made up of graduates of Johns Hopkins University Medical Department and other medical schools of Baltimore who are practicing in New York, will hold its annual dinner, December 5, at the Waldorf-Astoria.

Hospital News.—The alumni of the Hospital for the Relief of the Ruptured and Crippled held its thirteenth annual reunion, November 23-24; the occasion was attended by clinics and a scientific session and a dinner at the Columbia University Club.——Plans have been completed for the new $500,000 pathologic laboratory to be erected by the city on the grounds of Kings County Hospital. The new laboratory is intended to serve the Brooklyn Medical Center.——St. Vincent's Hospital will shortly launch a campaign to raise $1,000,000.

Presbyterian Hospital Building Fund.—The president of the Presbyterian Hospital writes in the New York *Times* that $700,000 must be subscribed before the New Year to complete the hospital's building fund of $7,000,000. Following the appeal made to the public last spring for $4,500,000, gifts have been received ranging from 25 cents to $500,000 from people in every walk of life; the student nurses and alumni of the Presbyterian Hospital School of Nursing obtained $541,335; a committee of women obtained $341,000, and residents in the vicinity of the new hospital center $156,539, including a gift of $60,000 from 15,000 postal employees. The structural steel work on the new hospital building at One Hundred and Sixty-Eighth Street and Broadway is almost completed. The central group of buildings, in addition to housing the Presbyterian Hospital, will include the College of Physicians and Surgeons of Columbia University, Sloane Hospital for Women and the Vanderbilt Clinic, and will be ready for occupancy in 1927.

NORTH CAROLINA

Personal.—Dr. Watson S. Rankin, director of the Hospitalization and Orphanage Sections of the Duke Endowment, will move to Charlotte, January 1, to establish headquarters in that city for this work.——Dr. Eugene L. Swan, of the American Social Hygiene Association, recently delivered a series of lectures on "The Sex Factor in Human Life" at the University of North Carolina, Chapel Hill, and the North Carolina State College, Raleigh.

Society News.—Members of the Buncombe County Medical Society recently tendered a complimentary dinner to Dr. Roswell E. Flack, Asheville, prior to his leaving for Memphis, Tenn., to engage in practice in that city.——At the recent meeting of the Second District Medical Society, Washington, Dr. Robert Du Val Jones, New Bern, was elected president. Dr. William de B. MacNider, president of the state medical society, gave an address.——The physicians of Durham have recently announced an increase of 50 per cent. in their visiting fees and that calls after 8 p. m. will be charged for at an added rate.——Dr. Annie L. Alexander, Charlotte, addressed the Women's Professional Club of that city, November 26, at the annual dinner on "Health for the Business Woman."

OHIO

American Field Service Fellowships.—The *Cincinnati Journal of Medicine* reports that the American Field Fellowships for French Universities as administered by the Institute of International Education are on file in the office of the dean of the University of Cincinnati College of Medicine, where applications may be obtained. The fellowships of $1,200 are open to men only and have a time limit of one year, but renewal for a second year may be secured. Payments are made quarterly and steamer fare is provided against sailing in June, 1926. Applications must be sent before December 15.

PENNSYLVANIA

Society News.—Dr. Lewellys F. Barker, professor emeritus of medicine, Johns Hopkins University Medical Department, Baltimore, addressed the Ninth Censorial District of the Medical Society of the State of Pennsylvania, November 17, at the Carnegie Library, Pittsburgh, on "Health and Life."——Earl C. Rice, D.D.S., addressed the Montgomery County Medical Society, Haverford, November 9, on "Dental Conditions in Their Relation to Medicine."——Attorney John R. Geyer addressed the October meeting of the Dauphin County Medical Society on "The Doctor in Court."——The Fayette County Medical Society held its annual clinic in October,

which was attended by more than 100 physicians and was addressed by Dr. David Riesman and Dr. George P. Muller of the medical and surgical staff, respectively, of the University Hospital, Philadelphia.——Dr. John A. Kolmer addressed the Lycoming County Medical Society on "Scarlet Fever, the Dick Test, Active Immunization and the Serum Treatment."

Philadelphia

Sesqui-Centennial International Exposition.—Mayor Kendrick issued a statement, November 23, outlining the plan of the Sesqui-Centennial International Exposition, which will open in League Island Park, June 1, 1926, to celebrate the one hundred and fiftieth anniversary of the Declaration of Independence. The exposition space already definitely planned exceeds by more than a half million square feet the area available in the Paris Exposition of 1900. There will be three great exposition palaces in the midst of a 2,000 acre tract, a stadium accommodating 150,000 and an auditorium seating 20,000. At least twenty other special buildings are being planned by governmental, state and commercial agencies. Among the nations of the world that will be represented officially or through industries or citizens are France, England, Italy, Spain, Belgium, Holland, Sweden, Norway, Denmark, Poland, Switzerland, Bulgaria, Roumania, Czechoslovakia, Jugoslavia and several Asiatic and South American nations. The lighting will be sensational in its scope and splendor. An auroral display representing the greatest aggregation of light ever concentrated in one spot will be visible as far as New York and miles out to sea. A Liberty Bell, the height of a six-story building, containing 20,000 lights, will span Broad Street. The president of the United States will speak, July 3-4. There will be an outstanding list of events, conventions, displays and concessions. The U. S. government, through various departments, will install a great variety of exhibitions (THE JOURNAL, October 3, p. 1070, and October 17, p. 1323).

TENNESSEE

Society News.—At the recent meeting of the Middle Tennessee Medical Association, Fayetteville, Dr. William S. Rude, Ridgetop, was elected president; Dr. Thomas D. McKinney, Nashville, vice president, and Dr. Sam P. Bailey, Nashville, secretary-treasurer, reelected. Among the speakers at the meeting was Dr. William D. Haggard, Nashville, President of the American Medical Association. The Lincoln County Medical Association gave a banquet in honor of the meeting.

UTAH

Warning—Microscopes Renovated.—A correspondent writes that "Major Raymond de Cercy, Chevalier of the Legion of Honor, civil engineer, A.M.P.P.E.C., of 1728 Eleventh Avenue, New York, 1021 Lake View Boulevard, Seattle, 966 Market Street, San Francisco, and Long Beach," has been calling on physicians in the West for the purpose of renovating their microscopes. He has a pocketful of references, plenty of diamonds, a cane and an engaging manner. "Major de Cercy" usually takes the microscope without giving an estimate of the cost and returns next day with the instrument and a bill for from $40 to $60; he then proceeds to justify the bill by stating that about everything about the microscope had to be replaced. He collects, and the victim wonders what it is all about. Investigation shows, the correspondent says, that a local technician would have attended to the cleaning with probably no replacements at all for not more than $5.

WEST VIRGINIA

New Health Officer.—The Kanawha County Court issued an order, November 14, establishing a "modern" county health department, and appointed Dr. Roy Ray of Clendenin full-time county health officer. The court appropriated $8,650 for this purpose and authorized Dr. Ray to employ assistants. The state health department will also contribute $600 semi-annually. The health officer, in addition to general county health work, will care for patients in the county infirmary and county jail.

CANADA

Public Instruction in Health.—The executive committee of the Canadian Medical Association reported at the last annual meeting that a "public enlightenment program" had been inaugurated and a lay editor engaged to work with the publicity committee. The newspapers of Canada were offered one article a week at a contract price ranging from $30 to $120 for the year. The editor agreed to accept half of the gross proceeds for her services. At the annual meeting of the association, the executive committee was authorized to continue to employ the editor and to pay her a salary of $1,000 a year and to give a percentage of receipts above that amount. The new chairman of the publicity committee, Dr. John G. Fitzgerald, was authorized to add to his committee such personnel as he desires to insure the success of that department.

Society News.—About 100 physicians and their wives from Lincoln, Welland, Wentworth, Halton and Haldimand counties attended the annual meeting of District No. 4 of the Ontario Medical Association, at Niagara Falls, recently. The day was devoted to clinical work at the General Hospital, to the presentation of cases and discussions. At the banquet at the Clifton Hotel, the president of the Ontario Medical Association, Dr. John A. MacGregor, and the secretary, Dr. Thomas C. Routley, gave addresses.——Dr. George E. Wilson, Toronto, recently addressed the Hastings County Medical Society on "Surgical Emergencies."——Dr. William E. Ogden, Toronto, addressed the Victoria County Medical Society, Lindsay, on "Too Late Versus Preclinical Diagnosis of Tuberculosis."——Dr. Hamnet A. Dixon, Toronto, addressed the Peterborough County Medical Society on "Common Skin Affections."

GENERAL

American Board of Otolaryngology.—There were 143 applicants examined by this board, October 19, at the examination held at the Cook County Hospital, Chicago, all of whom, except twenty-three, passed. The next examination will be in Dallas, Texas, April 19, 1926, for which applications may be secured from the secretary, Dr. Hanau W. Loeb, 1402 South Grand Boulevard, St. Louis.

Tax on Medicinal Alcohol.—As part of its program of tax reduction, the House ways and means committee has agreed to recommend the repeal of the war tax on medicinal alcohol. The repeal of this tax has been urged for years by retail druggists, who insist that it is an unreasonable tax on their business. The committee has recommended that the present tax of $1.10 per gallon be reduced to fifty-five cents per gallon, beginning Jan. 1, 1927, and that the remaining tax of fifty-five cents be eliminated, beginning Jan. 1, 1928. Fixing an advanced date for the reduction and final elimination of this tax will permit the drug trade to dispose of their present inventories of drugs. Many druggists have large quantities of drugs purchased under the tax of $1.10 per gallon.

Smithsonian Institution Seeks Larger Endowment.—The regents of the Smithsonian Institution, Washington, D. C., appealed to the public, November 23, for $10,000,000 for endowment. Contrary to a general opinion, the Smithsonian Institution is not a government bureau, but was privately founded and endowed, and is privately directed and financed. The institution is unable to undertake sixteen major projects in fundamental research because of a lack of funds. The institution was founded in 1846, since when its initial endowment has only doubled. Among the projects that will be carried out with the aid of a larger endowment are researches in paleontology, studies on world weather, the genesis of minerals and studies on five major groups of vertebrates.

Campaign for Physicians' Home.—At the ceremony of launching the campaign for endowment for The Physicians' Home, Inc., at the Waldorf-Astoria, New York, November 23, a number of substantial donations were received. Noted speakers outlined the purposes of the campaign. Samuel Untemeyer said, among other things:

> Above and beyond all professions and occupations, and quite in a class by itself, stands the physician's as the emblem and personification of a life dedicated to public service in its highest sense. In that respect the ethics and practices of your great profession are unique. From the obscure, patient, overworked country doctor, who toils at all hours by day and night relieving suffering and ministering alike to the poor and the rich, to the men who have climbed to the top and have attained national and international fame, "service" has been the keynote of their lives. It is no exaggeration to say that fully one half of their professional lives are devoted to public and charity work. . . . To your everlasting credit be it said that no man can attain the highest professional eminence who does not participate in this service. I believe that there will be a quick and generous response to this appeal. To think otherwise would be to lose one's faith in the sense of justice of our people.

Among the other speakers were Congressman John J. Kindred, Rabbi Israel Goldstein, Dr. Walter P. Bowers, editor, *Boston Medical and Surgical Journal*, Dr. William H. Dieffenbach, Mr. Don C. Seitz of the New York *World*, and Dr. Robert T. Morris, president of the Physicians' Home. Contributions should be forwarded to the headquarters office in the *Times* Building, Forty-Second and Broadway, New York.

News of Epidemics.—The epidemic of scarlet fever at Elgin, Ill., November 17, amounted to 96 cases; children under 16 years of age were forbidden to attend public meetings.——Public meeting places were closed at Colon, Mich., early this month to prevent the spread of a scarlet fever epidemic.——The health commissioner of Baltimore issued a warning November 15 about measles, mumps and chickenpox, which in the previous week were responsible for 252 cases of sickness as compared with 44 during the corresponding week last year.——One hundred senior high school pupils at Clinton, Ind., were recently ordered to be vaccinated or stay away from school on account of several new cases of smallpox in the city; all except one responded to the warning. Among junior high school pupils, all but four among 250 ordered vaccinated complied.——The board of health of Comanche, Iowa, has placed a ban on all public gatherings and closed the schools on account of a diphtheria epidemic; there have been several fatal cases.——The Hinchman School near Merchantville, N. J., was closed by the state board of health, November 19, on account of an epidemic of scarlet fever.——Four school children have died of diphtheria in Perth Amboy, N. J., since the opening of schools. There had been a total of twenty-five cases, November 17.——Twenty-five cases of typhoid fever in the vicinity of Delavan, Emden and Lincoln, Ill., were reported, November 23, as having been traced to a banquet at Emden. Every patient attended the banquet and all the victims but two were women.——The seventh ward schools of Greensburg, Pa., were recently closed on account of an outbreak of five cases of scarlet fever in that city.

LATIN AMERICA

Personal.—Dr. F. de Magalhães was the principal speaker at the recent unveiling of the bust of Pasteur, at the head of Pasteur Avenue, Rio de Janeiro, presented by the Sociedade de Medicina e Cirurgia of Rio in the name of the physicians of Brazil.——Dr. Gastão Guimarães is in charge of the newly completed model emergency hospital at Rio.——The *Brazil Medico* states that Dr. Afranio Amaral, formerly head of the Butantan Institute, has been requested by Harvard University to organize the laboratory for research on animal venoms there.——Dr. Gavião Gonzaga has left Rio for New York on a mission from the public health service. He intends to study at the Rockefeller Institute at New York.

FOREIGN

Vienna Training School for Midwives to be Closed.—The *Wiener klinische Wochenschrift* states that, owing to the surplus of midwives in Vienna, the school will be closed for a year after the close of the present course. The death of the former director, Dr. Piskacek, and the new regulations as to the requirements for candidates influenced the decision.

Personal.—Dr. Cardenal, Barcelona, has completed fifty years of professional service, and a series of celebrations have been held by his friends and pupils in the university halls and all the hospitals in which he has operated or officiated. The city council joined in the celebration by donating 6,000 pesos for a traveling fellowship in his honor.——Mr. James Sherren delivered the Bradshaw Lecture before the Royal College of Surgeons, England, November 11, on "Gastrojejunostomy," and Prof. William Wright the Thomas Vickary Lecture, November 18, on "The Medieval Conception of the Anatomy and Physiology of the Central Nervous System."——The Jubilee Committee, Institute for the Study of the Brain, Leningrad, arranged for an official celebration of Professor Bechtereff's fortieth year in scientific work. The celebration was followed by a series of meetings of various scientific societies.——Dr. Edward M. Merrins has retired from the editorship of the *China Medical Journal*.——Dr. R. Magnus, professor of pharmacology at Utrecht, delivered the Croonian Lecture at the College of Physicians, London, in October. His subject was "The Influence of Unconscious Reflexes on Movement and Attitude." The Baly medal was presented to him at the same time.——Dr. E. Baur, Berlin, is the president of the German Society for Study of Heredity and of the executive committee in charge of arrangements for the Fifth International Congress for Research on Heredity, which is to meet at Berlin in September, 1927.——Dr. C. Chagas, chief of the Brazil public health service, was presented with the honorary gold medal of the Hamburg medical faculty when he spoke recently at the Institute for Tropical Diseases on "Chagas' Disease: Brazilian Trypanosomiasis." He delivered a similar address before the Berlin Medical Society.——Dr. Cousot, Dinant, has been elected president of the Académie royale de médecine of Belgium for 1926, and Drs. Gallemaerts and Fredericq, vice presidents.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Nov. 14, 1925.

A Memorial to John Irvine Hunter

A memorial to the boy anatomist and genius John Irvine Hunter, whose untimely death was a tragedy for science, has been arranged in Australia. A fund has been subscribed, with six objects. The first is to have a portrait of Hunter painted which is to be displayed in the great hall of the University of Sydney. The second is to place a bust of Hunter in the medical school of the university. The third is to establish an annual oration on some subject embodying the results of original thought research, and award a medal. The fourth is to institute a library to contain all current medical, scientific and clinical literature and standard works of reference in each branch of medicine. The fifth is to establish a laboratory for clinical research, to be known as the John Irvine Hunter Research Laboratory. The New South Wales government is to be requested to provide the building, while its endowment and equipment will be a charge on the memorial fund. Finally, it is proposed that annual scholarships will be offered to research workers in the laboratory. They will be encouraged to focus their attention on the diseases commonly encountered in Australia, and especially those affecting children.

Unfit Aliens

An official return of aliens of the three months ending in September shows:

	1925	1924
Landed	153,632	164,131
Embarked	166,989	175,820
Refused leave to land	592	611

The figures for the nine months ending in September were:

	1925	1924
Landed	316,615	321,448
Embarked	305,920	311,562
Refused leave to land	1,873	1,827

In a new journal, the *Annals of Eugenics*, Prof. Karl Pearson and Miss Margaret Moul give the results of examination of Russian and Polish Jewish child immigrants into this country. These were not selected because they were Jews, but because they formed a large body which could easily be examined. The investigators find that on an average this alien Jewish population is somewhat inferior physically and mentally to the native population, but it is not so markedly inferior as some who want to stop all immigration are inclined to assert. They admit that some of these alien children from the academic standpoint have done brilliantly; whether they have the staying powers of the native race is another question. They recommend a standard for immigrants 25 per cent. higher than the mental and physical averages of the native population, below which none should be allowed to enter. They state that there is no evidence that a lessening of the aliens' poverty, an improvement in their food, or an advance in their cleanliness will substantially alter their average grade of intelligence and, with it, their outlook on life. They say that the immigrant should be judged by what he is when he arrives and rejected or accepted according to this; and that it is idle to argue that his intelligence will be modified—any more than the color of his hair—by residence in our country. In estimating intelligence, they do not make any allowance for the fact that the alien is somewhat handicapped immediately on arriving in a strange country by the effects of the oppression from which he has fled. As to the inferiority of the Jews to the native population, there is strong evidence to the contrary in

the success of the Jews who have arrived young in this country and especially in those of the second generation. Not only in commerce but also in science and art the Jew has shown here, as in other countries, remarkable ability. The race that can claim mental superiority over him is yet to be produced.

Typhoid Outbreak Due to a Carrier

An outbreak of typhoid in Streatham (Southwest London) has been traced to a milkman who acted as a carrier. So far there have been twenty-seven affected—twenty women, six children and a youth of 17—with two deaths. Most of the persons attacked are members of a local Baptist chapel and live within half a mile of it. The explanation is that the patients are customers of a member of the congregation who keeps a dairy shop. Three weeks ago the health officer was able to trace the infection of the milk supply, but how it became affected at first baffled investigation. It was ascertained that the dairyman obtained his supplies from a larger firm in the district, which, in turn, received the milk from various farms in Surrey, Sussex and Kent. Protracted bacteriologic tests of the farm equipment, the cattle, the dairymaids and other workers all gave negative results, and both at the farm and at the shops it was found that the precautionary measures for cleanliness and sterilization could not be better. Attention was therefore turned on the persons engaged in distributing the milk. It was then discovered that a man so employed was a carrier of typhoid, though, as far as could be ascertained, he never had the disease and was perfectly healthy. He has been sent to hospital for treatment. There is no legal provision enabling a typhoid carrier to be debarred from undertaking what occupation he pleases, but the local health authority has power to grant him an allowance making it unnecessary for him to depend on employment.

The Certification of Insanity

Sir Maurice Craig, physician for and lecturer on psychologic medicine at Guy's Hospital, gave important evidence at a sitting of the royal commission on lunacy. He said that no branch of medicine had been so trammeled by legal enactments as psychologic medicine, and that as a result its progress had been slow, and many physicians were shy of taking it up. In the certification of persons of unsound mind an obligation that had nothing to do with medicine had been placed on physicians by the legislature. The definition of insanity in the lunacy acts frightened a large number from undertaking the care of early cases. It was not surprising that physicians in increasing numbers were refusing to sign certificates for recent cases on the ground that they do not understand what legal insanity means. The lunacy acts of 1890 and 1891 were intended to protect the liberty of the subject. In practice they had interfered with the liberty of many mentally sick persons who were capable of using their liberty properly. Throughout the acts, emphasis was laid on the legal aspect, and the medical treatment took a secondary place. Certification, in addition to acting as a deterrent to treatment, brought into the lives of those who had been subjected to it the feeling that they were in some way different from their fellow men, and from that feeling they might never be able to free themselves, even when restored to health. Experience had taught him that the harm done by certifying patients in the early stages of insanity far outweighed any advantages. If certification was done away with, the whole outlook of psychologic medicine would be changed, for it would then come into line with the treatment of physical disease. If certification was abolished, he thought that the number of willing patients would steadily increase. Provision for their treatment should be made in general hospitals or clinics which were separate from and not in the grounds of mental hospitals where certified patients were taken. There were, however, patients whose behavior made it impossible for them to reside in an ordinary hospital, and for this reason special hospitals of the type of the Maudsley Hospital would be necessary. The unwilling patient would have to continue to be treated in psychopathic hospitals under some form of provisional notification or certification. Willing patients should be able to go to licensed houses for treatment on their own written request. Legislation should be passed to allow the treatment of non-volitional or passive patients on notification only, and of the unwilling patients by some form of provisional certification. With regard to the treatment of patients who could pay, willing and passive ones should be allowed to go to nursing homes or to the houses of physicians. He was in complete disagreement with the opinion that private persons should not be permitted to take for gain patients suffering from mental disorder. Outpatient clinics for mental patients should be available at all hospitals. He thought the best system was that which existed at Guy's Hospital, where there was one neurologic department attended by all patients, whatever their nervous complaint. Where no hospital was available, a special clinic should be established. Turning to the legal side, he said that the actions brought against physicians had caused great unrest in the medical profession. Physicians did not want their time taken up in this way, even if they made a successful defense. They wanted protection against the actions themselves.

The chairman said that the commission was sympathetic toward the aim of restoring confidence in the medical profession in discharging a difficult duty, but the question of the measures by which this could be done was difficult.

The Irresistible Impulse as a Defense for Murder

In the case of a youth of 19, the defense of irresistible impulse for a murder committed under peculiar circumstances failed. He had borne an excellent character and, according to the evidence, was of an affectionate disposition and a loving son. Two years ago an intimacy began with his uncle's wife, a woman whose mother was a Eurasian, and he came under her domination. She was a fascinating woman, but of somewhat violent disposition, and quarreled with her husband a good deal. The woman thought she was pregnant by the youth and they discussed a "way out." Eventually at her request he strangled her with his necktie, in a wood. He was convicted of murder. In the court of criminal appeal his counsel complained that the judge at the trial had failed to direct the jury that a person charged with a criminal offense was irresponsible if he committed the act under an impulse which he could not resist by reason of disease of mind. In giving judgment, the lord chief justice said that it had been suggested to medical witnesses at the trial that when the woman asked the youth to strangle her he was overcome and thereupon lost his conscious mind and his subconscious mind took control. The jury came to the conclusion, as it could not fail to do, that he was guilty of murder. The judge fully and clearly explained the law, but it was said that he misdirected the jury by not directing that "a person charged with a criminal offense was irresponsible if he committed the act under an impulse which, by reason of mental disease, he was in substance deprived of any power to resist." In other words, the complaint was that the judge did not tell the jury that something was the law which was not the law. The theory advanced was the fantastic one of uncontrollable impulse, which, if it became part of the criminal law, would be merely subversive. It is to be hoped that the time is far distant when it will be part of the criminal law. The defense of insanity in the present case, as in so many cases, was merely nonsense. The appeal was dismissed.

PARIS

(From Our Regular Correspondent)

Nov. 10, 1925.

Nervous Diseases of Industrial Origin

At the International Congress on Industrial Accidents, recently held in Paris, M. Crouzon spoke on nervous diseases of industrial origin. He first presented an etiologic and clinical study separated into two divisions and several subdivisions: 1. Nervous diseases of exclusively or essentially occupational origin, including those due to occupational intoxication: chronic lead poisoning; mercurial poisoning; arsenical poisoning; carbon monoxid poisoning; poisoning by carbon disulphid; poisoning by hydrocarbons; poisoning by chlorinated carbon compounds used as solvents of rubber and of certain ingredients of varnishes (manufacture of artificial pearls); finally, more rarely, poisoning by phosphorus, zinc, tin, copper, industrial alcoholism, hydrogen sulphid, picric acid, tobacco, etc. Essentially occupational diseases should be considered also: caisson disease, electric shock, and accidents resulting from work under high temperature. There are also nervous affections of industrial origin produced by indirect causes, such as the renal and visceral disorders of lead poisoning. 2. Nervous diseases occasionally of industrial origin, such as occur in miners, water carriers, writers, violinists, etc. The author points out that, while, from the point of view of pathology, the poisons may affect the brain, the medulla or the nerves, clinically it is chiefly the peripheral nerves that are affected. He emphasizes the insufficiency of the act of Oct. 25, 1919, which deals only with paralysis of the extensors and with hysteria resulting from lead poisoning; and with trembling and paralysis due to mercurial poisoning.

The International League Against Venereal Disease

The governing council of the Union internationale contre le péril vénérien, which comprises delegates from thirty-three nations and the headquarters of which are at the Hôtel des sociétés savantes in Paris, convened, October 3-9, at the Faculté de médecine of Paris, under the chairmanship of its president, M. A. Bayet of Brussels. The following countries were represented: Argentina, Belgium, Brazil, Bulgaria, China, Costa Rica, Denmark, France, Germany, Great Britain, Guatemala, Hungary, Italy, Japan, Jugoslavia, Netherlands, Poland, Spain, Switzerland, the United States and Venezuela. The resolutions presented by the various committees were concerned primarily with the surveillance of emigrants, who, when affected with venereal disease, are usually ignorant of its gravity and of the menace that they present to others. The governing council requests that, before their departure, emigrants be instructed in such matters by active propaganda (public press, posters, motion pictures, leaflets) to be carried out by the various national societies which are constituent members of the international league. Cases of venereal disease should be discovered in the same manner as other contagious diseases, and persons affected with contagious venereal disease should not be allowed to embark unless the boat furnishes adequate medical treatment. The general secretary must endeavor to see to it that officials will admit only those immigrants who are in a condition compatible with the program of the international league.

Each national society will continue in an energetic manner to look after the prophylactic, sanitary and moral education of emigrants, supplying them with pamphlets printed in their native languages, giving a list of centers where they may obtain treatment. Certain countries, particularly France and the United States, refuse admission to immigrants with venereal disease. The general adoption of such restrictions would no doubt induce prospective emigrants to submit to treatment. The general secretariat, during 1926, might try to ascertain the best means of giving emigrants the necessary moral and sanitary aid.

Relative to the surveillance of boundaries between countries, the governing council solicits from Spain, Portugal, Belgium, Switzerland, Hungary, and from the countries of South America that have joined the international league, an inquiry into: (1) the regular movement of workmen who are employed by the day, or for a definite time, in the neighboring countries; (2) the incidence of venereal disease among such workmen, and (3) the conditions on which authorization to cross the frontiers depends. Without waiting for the completion of this inquiry, the national societies will undertake at once a moral and prophylactic propaganda among the population that is constantly shifting back and forth along the frontiers.

The surveillance of the seaports is another important task. An endeavor should be made to interest the shipowners in the crusade against venereal disease, for great benefit would thereby accrue to the sailors. The question of the treatment of sailors on board vessels lacking medical service should be studied and solved. Likewise, the various national societies composing the league should provide for sailors, on their arrival and stay in port, suitable instruction pertaining to sanitation, prophylaxis and morals, by means of the public press, lectures, leaflets, posters, etc. A complete list of the dispensaries to be found in the various ports of the world should be prepared and published and furnished to the sailors, in order to facilitate continuous treatment. The aid of shipowners should be solicited with a view to the creation in all the ports of a permanent information bureau where sailors could secure reliable information in regard to the therapeutic resources of the city and where they could be warned against advertising charlatans.

There remains the problem of prostitution. Whereas therapeutic sterilization of patients affected with venereal disease is one of the principal means of bringing about the suppression of syphilis and the diminution of other venereal diseases, and whereas the reglementation of prostitution—that is, its attempted regulation by registration, periodic inspection and police supervision—has, at no time and in no country, enabled us to lessen materially the damage caused by venereal disease, while, on the other hand, such reglementation is repugnant to a sense of justice and to all ideas of social decency, the governing council recommends: (1) the suppression of the reglementation of prostitution; (2) the application of measures directed toward the people as a whole and based on the broadest conception of the principle of individual liberty; (3) the adoption by the governments of measures designed to suppress the social causes which, in the last analysis, provoke and favor the spread of prostitution; (4) enlightenment of the people as to the dangers of venereal infection, and the providing of treatment (gratuitous if necessary) for every person affected, in accordance with his needs, and (5) the suppression by measures adapted to the customs and habits of each country of (*a*) solicitation on public streets; (*b*) enticing to vice, and, particularly, corruption of the young by any means whatever, though not directly obscene; (*c*) attempts to lead astray or lure away persons (even though of age and readily consenting) with a view to subjecting them to prostitution; (*d*) the admission by any person by any means whatever that he (or she) will prostitute himself (or herself) or that he or she favors the prostitution of others, and (*e*) advertisements of drugs designed to cure venereal disease, and, in a general way, of all publicity that is not of a medical character.

The governing council recommends further that a special appeal be made to the medical profession, asking its full and complete cooperation with respect to the advice given patients affected with venereal disease.

GENEVA

(From Our Regular Correspondent)

Nov. 10, 1925.

Control of Vaccines and Serums

At the recent meeting of the Swiss cantonal directors of sanitary affairs, the necessity of government control of serums and vaccines was recognized. The use of these products has given rise to important industries in all countries, the control of which should be directed toward insuring efficacious, innocuous and authentic products. The control should apply to imported products as well as to those of private laboratories in Switzerland. Numerous countries already exercise control, and some of them allow the importation only of serums and vaccines that are controlled in the country where they are made. The federal government, by virtue of a law concerning epizootic diseases, now controls vaccines and serums for veterinary medicine. Such a law confers the necessary power for controlling other similar products.

International Bureau of Public Hygiene

At the extraordinary session of the committee of the International Bureau of Public Hygiene, held in Paris recently, some interesting contagious disease data were given. The mortality from scarlet fever was very high in Roumania. During the Great War it almost disappeared, but lately has returned in an attenuated form. Reports show the importance of hospital isolation. In cities where the greatest number of patients are sent to hospitals, the mortality has dropped from 25 per cent. in 1898 to 6.5 per cent. in 1923, while in the small towns and villages the mortality of those treated at home is 48.39 per cent., and of those hospitalized, 12.11 per cent. Bacteriologic researches in scarlet fever virus have been actively carried out in Italy, England and the United States.

In British India, considerable work has been done on cutaneous parasites of certain rodents. As a plague eradicative measure, the various services of hygiene have attempted to obtain data on the geographic and seasonal distribution of rats and fleas. A report is said to be forthcoming.

At Madagascar, or at least at Tananarive, all the rats captured belonged to the species *Mus alexandrinus*. Mice and shrew-mice abound, but they are supposed to play no part in the propagation of plague. Sixty per cent. of the fleas taken from the rats belonged to the species *Xenopsylla cheopis;* the other species were *Ctenopsylla muculi* and *Echidnophaga* (*sarcopsylla*) *Gallinacea* in about equal proportion. In houses, *Ctenocephalus canis* abounds, and *P. irritans* is less numerous.

In Europe, the black rat, which during the eighteenth century had been driven out by the gray rat, has shown a tendency to reappear. This may be accounted for by the fact that the black rat finds agreeable living conditions in the modern construction of cellars.

As to fleas, *Xenopsylla cheopis* is regarded as the chief distributer of the plague. It lives especially in tropical regions, but by adopting the rat as a host it invades temperate climates. *Ceratophyllus fasciatus* also is pestiferous, and lives more particularly in rats' nests. Generally speaking, from the south to the north of Europe, and from the coast to the interior, *Ceratophyllus* increases in frequency, while *Xenophylla* decreases. *Pulex irritans*, a parasite of man, is rarely responsible for transmission of interhuman plague.

A note on cancer mortality in Spain from 1900 to 1920, which was presented to the bureau, showed an increase. Statistics from Czechoslovakia present the same evidence. This is the case nearly everywhere, the incidence being greater in the female than in the male. The increase is rapid: of 1,000 deaths, the proportion due to cancer, which in 1919 was 45.2, rose to 60.1 in 1923. Researches on cancer of the breast and uterus undertaken in England, Italy and Holland show that the number operated on early represents at the most 10 per cent. In Belgium, where cancer mortality represents about 50 per thousand of the total death rate, an increase has been noted, but it seems possible to explain it by the increase in the average duration of life.

Respecting locomotor ataxia and general paresis, a note from Japan states that it is as yet impossible to estimate the results of treatment with the arsenical compounds on the frequency of these two parasyphilitic processes. Data collected in Germany seem to indicate that the proportion of cases of tabes and general paresis, in relation to the number of cases of syphilis, is increasing, as if the virulence of the syphilitic virus or its neurotropism had become intensified. On the other hand, researches in England do not confirm this hypothesis.

The treatment of leprosy with ethyl esters of chaulmoogra oil has given encouraging but not conclusive results.

NETHERLANDS

(From Our Regular Correspondent)

Nov. 2, 1925.

The Fourth International Congress on Industrial Accidents and Occupational Diseases

The fourth congress on industrial accidents and occupational diseases, which convened recently in Amsterdam, was attended by 600 representatives from twenty-seven different countries. Previously there had been two separate congresses. This year the two branches on industrial accidents and on occupational diseases were combined into one congress, with the result that the subjects discussed covered a wider range. The congress appears to have been a complete success.

Following the opening address of Dr. Van Eden, the Swiss delegate Dr. Julliand addressed the assembly. He expressed the hope that the representatives of the various countries might do all in their power to cultivate international comity. Mr. Koolen, the minister of labor, presided officially at the opening session. He emphasized the importance of industrial medicine to the individual and to society as a whole. Up to the present time, occupational diseases have not been recognized as such in the Netherlands. Dr. Van Eden likewise stressed the importance of legislation pertaining to occupational diseases, which, rightly viewed, are industrial accidents.

The work of the congress was divided into several sections. I will summarize the principal communications.

THE EXHIBIT

There was a veritable museum of anatomy in which were exhibited collections of bones illustrating the sequelae of industrial fractures. A fine display of safety devices awakened considerable interest. Collections of photographs and drawings, and also statistical documents showing the improvement in labor conditions due to medical reforms instituted in certain factories, were exhibited.

TUBERCULOSIS AND TRAUMATISM

Zollinger of Switzerland presented a paper on traumatism in relation to tuberculosis. The author advanced the view that there is little evidence for ascribing the onset of any form of tuberculosis to traumatic factors. Neither the existence of a point of lowered resistance, nor tubercle bacilli circulating in the blood, nor transmission of tuberculosis to animals has given convincing results. While the existence of traumatic tuberculosis cannot be proved, we may speak of the existence of posttraumatic tuberculosis. But here it must be proved either that the accident introduced tubercle bacilli within the body or that the traumatism lowered the resistance and permitted the development of latent tuberculosis. When a traumatism can be incriminated of causing tuberculosis, we must distinguish between its effect in localizing the disease, in mobilizing a latent infection, or as

aggravating existing symptoms. The author reviewed the various kinds of wounds and their relation to tuberculosis. We cannot deny all relation between traumatism and tuberculosis, but we must accept the maximal duration of incubation. The subjoined table illustrates the author's experience with reference to the minimal and maximal periods of incubation.

The Minimal and Maximal Periods of Incubation

Localization	Minimum	Maximum
Tuberculosis of bones and joints	4 to 6 weeks	6 months; in tuberculosis of the cranium, the renal pelvis and the spinal column, 1 year
Pulmonary tuberculosis	End of the first week	4 months
Miliary tuberculosis ...	10 to 12 days, death 15 days after the accident	End of the third week; death 8 weeks after the accident or later
Meningitis	3 to 4 days	10 to 15 days
Pleurisy	End of the second week	3 to 4 months
Peritonitis	2 weeks	Beginning of the fourth week
Tuberculosis of testis and epididymis	3 to 4 weeks	1 to 2 months
Renal tuberculosis	3 to 4 weeks	Several months
Muscular cutaneous tuberculosis and tuberculosis of the mucosa	3 to 4 weeks	Up to 6 months
Tendovaginitis and tendosynovitis	2 months	6 months
Tuberculosis of the lymphatic glands	3 to 4 weeks	3 months

	Minimum		Maximum	
Eyes	Exogenous Infection	Endogenous Infection	Exogenous Infection	Endogenous Infection
Conjunctiva, cornea, sclerotic	5 to 7 days	5 to 6 weeks	10 to 12 days	3 months
Iris, choroid, crystalline lens, retina	5 to 7 days	6 to 7 weeks	End of the second week	4 months

The author said in conclusion that it would be a good thing if, in all countries, accident insurance companies were legally permitted to assume part of the cost of treatment and the compensation of persons in whom accident plays a part in the cause of tuberculosis. This paper was followed by communications by von Friedrich, Presbeano and Liniger. Liniger affirmed that a connection between a peripheral tuberculous process and an accident can be accepted only when the traumatism affected violently the diseased part, and when, furthermore, the beginning and the course of the disease are characteristic. Dr. Diez stated likewise that, in the majority of cases, we are concerned with a focus that preexisted at the site of the traumatism. The sole effect of the traumatism is to reveal and aggravate this preexisting focus.

THE VALUE OF OSTEOSYNTHESIS

Imbert and Cattalorda called attention to certain dangers and disadvantages of osteosynthesis in long-bone fractures. The dangers arise from the metallic substances employed and from the prolonged immobilization that is necessary. Professor Koch of Groningen, on the other hand, was enthusiastic in defense of the method, stating that he had observed excellent results from its use.

INSTRUCTION IN INDUSTRIAL MEDICINE

Industrial medicine has exerted a notable effect on the development of surgery and medical instruction in general. The instruction in industrial medicine is, however, as yet totally inadequate. Kaufmann pointed out that this lack applied to nearly all countries. Switzerland has done much to put this instruction on a systematic basis, but it is still inadequate. With the same object in view, Kalmus of Prague recommended the creation of institutes or of departments in the medical schools, in which instruction in industrial hygiene and first aid to the injured, and special training for medical industrial supervisors would be given. In this connection, Dr. Kaplun stated that in soviet Russia there were 2,000 industrial inspectors, 232 of whom were physicians. May 1, a central institute was opened for the protection of workmen. Dr. Adler explained that in Austria the medical industrial service is a subdivision of factory inspection, coming under the department of sociology.

ACCIDENTS TO THE EYES

Professor Elschnig of Prague reported statistics on eye accidents, covering fourteen years. He concluded that most of these accidents could be avoided if protective measures were systematically employed. He recommended that experienced oculists be attached to the industrial inspection service. Dr. Vanderhoeve of Leyden expressed the view that occupational eye diseases and injuries are rare and that most of them could be easily prevented if suitable hygienic rules were established and followed.

OCCUPATIONAL NERVOUS DISEASES

Professor Crouzon of Paris distinguishes: (1) nervous diseases exclusively or essentially of occupational origin and (2) nervous diseases of occasional occupational origin. There is reason to believe that the group of nervous diseases of occupational origin will eventually receive other additions from our more extended knowledge of the pathology of poisoning due to hydrocarbons, chlorinated carbon compounds, etc.

BERLIN

(From Our Regular Correspondent)

Oct. 31, 1925.

Occultism

At a recent session of the Arbeitsgemeinschaft für praktische Psychologie, at which were gathered representatives from widely different occupations, met to discuss the psychologic aspects of questions bearing on various occupations, Prof. Albert Moll, neurologist and psychologist of Berlin, spoke on the subject "Examination of the Problem of Occultism from the Logical and Psychologic Standpoint." Moll distinguishes spontaneous and nonspontaneous (experimental) phenomena. The latter are observed in sittings held to investigate under what conditions the phenomena appear, whereas the spontaneous phenomena are observed occasionally and are regarded as true. Moll has observed two main attitudes toward phenomena; some persons take them to be genuine without investigation; others reject them entirely because of conflict with their mode of thinking and natural laws, and because occultism is full of contradictions and many instances of fraud have been discovered. Since 1889, Moll has declared nothing impossible; but, on the other hand, has demanded compelling proof before accepting the genuineness of any phenomenon. Moll distinguishes two kinds of experimental sittings; in the first, one complies with the wishes of the medium, but, in the second, observers are permitted so to change the conditions that the proof of absence of fraud is furnished. Occultists, however, never permit sittings of the latter sort, although they sometimes make assertions that they do. In the sittings, one must not be influenced by any feeling of confidence—even toward the experimenters. For example, in an investigation of a woman clairvoyant who was supposed to be able to make diagnoses at a distance, a bribe of 1,000 marks was offered one of his collaborators if he would divulge to the experimenter Moll's diagnosis. Nor should one be unduly influenced by authorities. It is sometimes asserted that in the investigation of occult phenomena all modern scientific aids (for instance, photography) have been employed. But Sommer in Giessen avers that he has demonstrated that only "earthly things" are reproduced on the photographic plate. Reports of investigations of sittings cannot always be relied on. In this connection, Moll mentioned the lawsuit *Rudloff* v. *Moll*, in which three reports were presented, all varying in essential

particulars. They were termed "compromise reports," having been prepared by others from statements made by the signers, whereas, the fact is, each member of an investigating committee should testify only to what he himself thinks he observed. In the investigation of clairvoyants with supposed powers of medical diagnosis, the physician must not know the diagnosis in question, as he may unconsciously betray it to the medium.

Moll pointed out the errors of Schrenck-Notzing's work on motion induced from a distance. No accurate reports of the sittings are given. The occultists betray their weakness when they assert that one must see with one's own eyes what happens at the sittings, in order to be impressed. Before an experiment may be said to be scientific, an inquirer must be able to determine from a description of the method employed whether due diligence to prevent fraud was exercised. Personal observations are not necessary in true science. The investigator must not be influenced by the frequency of phenomena or by their improbability; nor are analogies to be regarded as proof. It is believed that prestidigitators are the best persons to investigate occult phenomena; but that is not necessarily true, for occultists are frequently specialists. However, the aid of prestidigitators is sometimes indispensable. Many assertions of occultists are contrary to all logic and experience, particularly those of astrologers. Since an experiment presupposes the ability to change the conditions under which the experiment is conducted, one would have to change the course of the stars in order to apply experimental principles to astrology. If one wishes to carry on a real scientific investigation, one must see to it that all possibility of artificial production of occult phenomena is excluded. In investigating telepathy, all the organs of sense must be excluded, one after the other; first, vision; then hearing, and possibly feeling. Before investigating sittings held in the dark, every experimenter should know how little he can perceive in the dark through the sense of touch, and that he has no idea whether he is touched with five or with ten fingers, or whether he is touched at all. The true specialist does not believe himself infallible. Investigators must be allowed to alter and gradually to restrict the conditions of experiments, and must be very skeptical of their own impressions.

Health Statistics in Prussia

The Prussian report on marriages, births and deaths for the first half of 1925 is favorable as compared with the corresponding period of 1924 and also when contrasted with the first six months of 1913. The number of marriages was 7.62 per thousand population, as against 7.11 for 1924, and it is not far below the figure for the first half of 1913, which was 8.15. The birth rate for the first six months of 1925 was 20.65, as compared with 19.58 for the same period of 1924. The birth rate is, however, still far below that of the first six months of 1913 (27.37). On the other hand, the mortality rate for the first half of 1925 was only 11.79; in 1924 it was 12.51, and in 1913 it was 14.14. The excess of births over deaths in the cities of Prussia with more than 100,000 population was 8.10 per thousand for the first half of 1925, or midway between the figures for 1924 and 1913 (6.34 and 12.38, respectively). The infant mortality rate for 1925 (first half) was 10.2, as compared with 11.3 in 1924 and 12.8 in 1913. In the city of Berlin, 9,644 marriages were contracted in the second quarter of 1925, which is 9.72 per thousand population; there were 12,356 living births, or 12.45 per thousand, and 11,257 deaths, or 11.35 per thousand population. The excess of births over deaths was 1,099, or 1.11 per thousand, which is again the lowest record in Prussia for the second quarter of 1925. The mortality rate, however, was 9.4 per thousand (1,082 deaths), which is only slightly above the average for cities with more than 100,000 population, which was 9.3.

Marriages

WILLIAM WIESS BELFORD, Georgetown, Texas, to Miss Elizabeth Russell of Jeffersonville, Ind., October 8.

JOSEPH HAMILTON SMITH, Edwight, W. Va., to Miss Hester Jane McLarren of Osceola Mills, Pa., September 9.

STANLEY HENRY MELLON, Newark, N. J., to Mrs. Madelyn Crane Friedlein of Bloomfield, October 3.

GEORGE H. WEST, Armstrong, Iowa, to Miss Martha Hansen of Des Moines, at Chicago, September 8.

GEORGE T. COLVARD, Florence, Colo., to Miss Salla Fleda Harrell of Welch, W. Va., November 1.

MARTIN VAN RAALTE, St. Louis, to Miss Elsie Louise Kohl of Belleville, in Effingham, October 15.

WILLIAM A. KENNEDY, Minneapolis, to Miss Helen Marie Dore of St. Paul, October 7.

GEORGE A. RICHARDSON to Miss Kathryn Embery, both of Philadelphia, October 7.

HAROLD FRANCIS SMITH to Miss Aetna Hunt, both of Iowa City, August 24.

LAY MARTIN to Miss Carolyn M. Bresee, both of Baltimore, November 19.

Deaths

Albion Walter Hewlett ✠ San Francisco; Johns Hopkins University Medical Department, Baltimore, 1900; assistant instructor and assistant professor of medicine, Cooper Medical College, San Francisco, 1903-1908; professor of internal medicine and director of the clinical laboratory, University of Michigan Medical School, Ann Arbor, 1908-1916; secretary and professor of medicine, Stanford University School of Medicine, San Francisco; member of the American Physiological Society, the Association of American Physicians, the American Society for Clinical Investigation and the American Society for Experimental Pathology; author of "Functional Pathology of Internal Diseases"; aged 51; died of brain tumor, November 10, at Philadelphia. Dr. Hewlett was appointed a member of the Council on Pharmacy and Chemistry in 1916, when he was professor of medicine at the University of Michigan Department of Medicine. He retained his membership when he was called to Stanford University School of Medicine, as professor of medicine, but in 1922 press of college work obliged him to request that his resignation be accepted. Dr. Hewlett was of great service to the Council, not only during his membership, but also before his appointment and after his resignation. An outstanding piece of work was his report, "Clinical Effects of 'Natural' and 'Synthetic' Sodium Salicylate" (THE JOURNAL, Aug. 2, 1913). In this report Dr. Hewlett classified and summarized the reports of clinical trials carried out, at the request of the Council, by leading clinicians, who used "natural" and "synthetic" sodium salicylate. Dr. Hewlett was chairman of the Section on Pharmacology and Therapeutics of the Scientific Assembly of the American Medical Association, 1916-1917; Secretary of the Section on Pathology and Physiology, 1911-1912, and Chairman of that section 1912-1913.

Richard Hickman Harte, formerly director of health and charities of Philadelphia, died, November 14, aged 70, at a hospital in Vicksburg, Miss., of pneumonia. Dr. Harte graduated from the University of Pennsylvania School of Medicine, Philadelphia, in 1878; after serving as resident physician at the University Hospital and studying in London and Paris, he formed an association with the Pennsylvania Hospital which continued until his death. He was formerly adjunct professor of surgery at his alma mater and on the staffs of St. Mary's, Orthopedic, Gynecean, St. Timothy's, Bryn Mawr (Pa.) Episcopal and Abington (Pa.) hospitals. Dr. Harte served in the American Ambulance Corps in France in 1916, then with the British Expeditionary Forces, and later was a colonel in the U. S. Army Medical Department. He was decorated for conspicuous service by the British and the Belgian governments and was awarded the American distinguished service medal. He was a past president of the College of Physicians of Philadelphia, the Philadelphia Academy of Surgery and of the American Surgical Association (1910-1911); a member of the American Society of Clinical Surgeons; the author of a "Handbook of Local

Therapeutics"; for twelve years editor of the *Transactions of the American Surgical Association* and a frequent contributor to medical journals.

William Emory Studdiford ✠ New York; Bellevue Hospital Medical College, New York, 1891; professor of obstetrics and gynecology, Columbia University College of Physicians and Surgeons, and formerly professor of gynecology at the University and Bellevue Hospital Medical College; member of the American Gynecological Society and the New York Obstetrical Society; director and attending obstetrician and gynecologist to the Sloane Hospital for Women, consultant to the Presbyterian Hospital, the New York Nursery and Child's Hospital and to the Franklin (N. J.) Hospital; aged 58; died, November 17, of heart disease.

Edward Bennet Bronson, New York; Medical Department of Columbia College, New York, 1869; member of the Medical Society of the State of New York; consultant to the New York City Hospital and the Babies' Hospital of the City of New York; aged 82; died, November 18, of burns received when his house caught fire.

Frederic Benjamin Mooers Cady ✠ Cambridge, Mass.; Medical School of Harvard University, Boston, 1907; member of the Boston Society of Psychiatry and Neurology and the New England Society of Psychiatry; served in the M. C., U. S. Army, during the World War; aged 44; died, November 12.

Eugene Walker Belknap ✠ Syracuse, N. Y.; Medical Department of Columbia College, New York, 1892; professor of obstetrics, Syracuse University College of Medicine; formerly on the staff of the Hospital of the Good Shepherd; aged 58; died, November 21, of pneumonia.

Edward Willard Watson, Philadelphia; University of Pennsylvania School of Medicine, Philadelphia, 1865; member of the Obstetrical Society of Philadelphia and the Medical Society of the State of Pennsylvania; aged 82; died, November 19, following a long illness.

Philip Jager, New York; Eclectic Medical College of the City of New York, 1899; member of the Medical Society of the State of New York; formerly connected with the New York Eye and Ear Infirmary and the Harlem Hospital; aged 51; died, November 16.

Benjamin L. Bosworth ✠ Knoxville, Tenn.; University of Louisville School of Medicine, 1887; formerly president of the Tennessee State Medical Association; delegate to the American Medical Association, 1910; aged 60; died, November 2.

William Smith Garnsey, Gloversville, N. Y.; Homeopathic Medical College of the State of New York, 1880; member of the Medical Society of the State of New York; formerly on the staff of the Littauer Hospital; aged 70; died, November 15.

George Waldo Crary ✠ New York; Medical Department of Columbia College, New York, 1885; formerly attending surgeon to the department of dermatology, Cornell University Medical College; aged 61; died, November 16, of pneumonia.

Frances Gordon Zwicker, Port Williams, Nova Scotia, Canada; Queen's University Faculty of Medicine, Kingston, Ont., 1903; died, September 25, of injuries received when the automobile in which he was driving was struck by a train.

William Henry Coffman ✠ Georgetown, Ky.; Hospital College of Medicine, Medical Department Central University of Kentucky, Louisville, 1876; formerly member of the board of health; aged 73; died, November 13, of heart disease.

Caleb Joseph Emery, Biddeford, Me.; Medical School of Maine, Portland, 1871; member of the Maine Medical Association; Confederate veteran; formerly on the staff of the Webber Hospital; aged 79; died, November 7.

Anthony Z. Valla, Los Angeles; University of Southern California College of Medicine, Los Angeles, 1888; University of Turin, Italy, 1891; for fourteen years connected with the French Hospital; aged 59; died, November 11.

John Franklin Davidson ✠ Cleveland; Miami Medical College, Cincinnati, 1887; formerly associate in anatomy at the Western Reserve University School of Medicine, Cleveland; aged 65; died, June 12.

Germaine Alexander Jordan, St. Louis; Washington University Medical School, St. Louis, 1888; member of the Missouri State Medical Association; aged 60; died, November 2, of carcinoma.

Walter Webb, West Chester, Pa.; Jefferson Medical College of Philadelphia, 1888; member of the Medical Society of the State of Pennsylvania; aged 60; died, September 3, of angina pectoris.

Thomas Emerson Mitchell ✠ Columbus, Ga.; Vanderbilt University Medical Department, Nashville, Tenn., 1892; aged 61; died, November 6, at a sanatorium in Atlanta, of valvular heart disease.

Cyrus Kay, Herkimer, N. Y.; Medical Department of Columbia College, New York, 1880; member of the Medical Society of the State of New York; aged 68; died, November 13.

Edwin Aaron Sanborn, Somerville, Mass.; Dartmouth Medical School, Hanover, 1876; member of the Massachusetts Medical Society; aged 76; died suddenly, November 14.

George Frank Young, South Haven, Mich.; University of Michigan Medical School, Ann Arbor, 1899; member of the Michigan State Medical Society; aged 50; died, November 13.

Andrew J. Murchison, Tomberlin, Ark.; University of Louisville School of Medicine, 1893; member of the Arkansas Medical Society; aged 64; died, October 19, of nephritis.

Porter Frederick Dodson ✠ Wilber, Neb.; Baltimore University School of Medicine, 1889; formerly member of the board of education; aged 59; died, November 14.

Edwin M. Newsom ✠ Newport News, Va.; University College of Medicine, Richmond, 1909; aged 40; died, November 9, at the Elizabeth Buxton Hospital.

Sarah Danforth Keeney, Plainfield, N. J.; Woman's Medical College of the New York Infirmary for Women and Children, 1874; aged 76; died, November 13.

Joseph M. Carroll, Laurens, Iowa; State University of Iowa College of Medicine, Iowa City, 1879; aged 77; died, in November, of heart disease.

Reuel James Tanquary, Fort Morgan, Colo.; University of Michigan Medical School, Ann Arbor, 1911; aged 37; died, November 16, of influenza.

Charles A. Henry, Sr., Fostoria, Ohio; Eclectic Medical Institute, Cincinnati, 1871; Civil War veteran; aged 81; died, suddenly, November 14.

Rodney M. Neathery, Farmersville, Texas; University of Nashville (Tenn.) Medical Department, 1887; aged 59; died suddenly, November 8.

William Henry Brownell ✠ Utica, N. Y.; Medical Department of the University of the City of New York, 1882; aged 71; died, in July.

Charles Wellington Allen, Los Angeles; University of Vermont College of Medicine, Burlington, 1882; aged 70; died, October 22.

Theodore Wilcox Bebout ✠ Stirling, N. J.; Baltimore Medical College, 1897; aged 52; died, November 8, of heart disease.

Walter Wilkinson, Jersey City, N. J.; Bellevue Hospital Medical College, New York, 1889; aged 57; died, November 16.

Laban Dennis, Orange, N. J.; Medical Department of Columbia College, New York, 1866; aged 85; died, November 18.

Julius W. Folk, Joliet, Ill.; Chicago Medical College, 1869; Civil War veteran; aged 81; died, November 10, of pneumonia.

Thomas H. Henry, Orangeville, Ont., Canada; University of Toronto Faculty of Medicine, Toronto, 1892; died in June.

Norman W. Meldrum, Ayr, Ont., Canada; University of Toronto Faculty of Medicine, 1873; aged 77; died, October 2.

Henry H. Bingham, Rochester, N. Y.; University of Buffalo Department of Medicine, 1884; aged 72; died in November.

Francis M. Bishop, Endicott, N. Y.; Hahnemann Medical College of Philadelphia, 1884; aged 85; died, November 10.

William L. Athon, Marshall, Ill.; Cleveland University of Medicine and Surgery, 1882; aged 65; died in November.

Ferdinand King, New York; College of Physicians and Surgeons, Baltimore, 1874; aged 73; died, November 15.

Giles Waite Bryant ✠ Somerville, Mass.; Dartmouth Medical School, Hanover, 1882; aged 68; died, November 8.

John Lowden, Fountaintown, Ind.; Eclectic Medical Institute, Cincinnati, 1878; aged 76; died, November 7.

Lester Gorham Houle, Kamloops, B. C.; McGill University Faculty of Medicine, 1912; aged 36; died, October 2.

Malcolm C. Black, Hespler, Ont., Canada; Trinity Medical College, Toronto, 1889; aged 66; died, August 23.

Joseph A. Silverman, Willamette, Ore.; Medical College of Ohio, 1894; aged 55; died, November 8.

Rocco Lopiano, New York; University of Naples, Italy, 1891; aged 62; died, November 19.

The Propaganda for Reform

IN THIS DEPARTMENT APPEAR REPORTS OF THE JOURNAL'S BUREAU OF INVESTIGATION, OF THE COUNCIL ON PHARMACY AND CHEMISTRY AND OF THE ASSOCIATION LABORATORY, TOGETHER WITH OTHER GENERAL MATERIAL OF AN INFORMATIVE NATURE

EXAMINATION OF BRANDS OF CINCHOPHEN

Report of the A. M. A. Chemical Laboratory

Cinchophen[1] was first described by Doebner and Gieske in 1887; a number of years later it was introduced as a medicine in the United States under the proprietary name "Atophan" by Schering and Glatz, New York, which at that time was the American agent for the firm "Chemische Fabrik auf Actien vorm. E. Schering, Berlin."[2] During the war the proprietary product became quite scarce, but in due time American chemists were synthesizing the needed "phenylcinchoninic acid." The A. M. A. Chemical Laboratory was called on at that time to test the various products. In its report[3] published in 1919 the Laboratory showed that manufacturers had perfected processes so that the products were all good and sufficiently pure to relieve the war scarcity. The melting point, however, which is one of the chief indexes of purity, was still somewhat low. In view of this the laboratory recently reexamined the market supply.

Cinchophen Examinations

Name of Distributor	Cost per Oz.*	Loss on Drying, per Cent.	Ash, per Cent.	Melting Point (Corrected)	Assay, per Cent.
Abbott Laboratories (*a*).....	$1.00	0.24	0.1	211-213	99.67
Abbott Laboratories (*b*).....	1.00	0.13	0.30	210-212	99.68
Benzol Products Company (*a*)....	....	0.18	U†	212-213	99.52
Benzol Products Company (*b*)....	0.50	0.055	U†	211-212	99.80
Calco Chemical Company (*a*).....	1.00	0.16	0.06	212-213	99.55
Calco Chemical Company (*b*).....	1.00	0.28	U†	211.5-213	99.10
Mallinckrodt Chemical Works (*a*).	0.60	0.29	0.12	211.5-212	99.52
Mallinckrodt Chemical Works (*b*).	0.71	0.06	U†	212-213	99.75
Morgenstern & Company (*a*).....	0.80	0.12	U†	212-213	99.15
Morgenstern & Company (*b*).....	0.60	0.28	0.12	210-211	99.47
Atophan—Schering & Glatz (*a*)...	2.50	0.23	0.05	214-215	99.70‡
Atophan—Schering & Glatz (*b*)...	2.75	0.23	U†	214-215	99.08‡

* The price actually paid (including postage in a few instances) when obtained from wholesale dealers in Chicago and in the East.

†Less than 0.05 per cent.

‡ The yellow color of the atophan solution makes it necessary to exercise care, particularly by practice titrations and use of controls, to avoid overstepping the end-point.

Twelve specimens of cinchophen representing six brands were subjected to the tests prescribed for the U. S. Pharmacopeia X, which becomes official, Jan. 1, 1926. All were odorless; the color ranged from white to a pronounced orange-yellow. The products all responded to the U. S. P. X qualitative tests. The melting point, moisture content, ash and assay (by titration according to U. S. P. X) are given in the accompanying table. The Pharmacopeia requires that the melting point should be about 210 C. In the assay the product is required to be 99 per cent. pure; all the products were found to be above this amount.

Each of the products conformed to all the requirements of the U. S. Pharmacopeia with the unimportant exceptions of color, in one instance, and of ash[4] in another instance. The findings, particularly the melting point, show that the American cinchophen is still purer than in 1918-1919, though at that time it was sufficiently pure for medical purposes. The examination also points out that all products reported on in this paper are equally good for therapeutic purposes, and one is no better than another.

[EDITORIAL NOTE.—The report of the Chemical Laboratory brings out some facts that are directly of interest to the medical profession, and indirectly of interest to the public. It shows, first, that the six brands of cinchophen examined by the methods of the new pharmacopeia are all of good quality. It shows, also, the exorbitant price that the public and the profession have to pay for proprietorship in medicines. Five of the six brands examined are nonproprietary forms of cinchophen. The sixth brand, Atophan, is a proprietary form of cinchophen, no better and no worse than the other five. The report shows that while cinchophen under its nonproprietary pharmacopeial name can be purchased at prices ranging between fifty cents and one dollar an ounce, Atophan costs from $2.50 to $2.75 for the same amount. Obviously there is no justification for such an exorbitant variation. It has frequently been pointed out that the price paid by the public for a "patent medicine" is, on the admission of the "patent medicine" people themselves, enormously over and beyond the fair trade value of the preparations. "Patent medicine" exploiters have virtually admitted that from fifty to seventy-five cents of every dollar charged for a given medicine is expended in advertising the stuff sold. When the physician needs to prescribe cinchophen, his patient will get just as good therapeutic results from a pure cinchophen costing fifty cents an ounce as he will get from an equally pure cinchophen under a fancy name costing $2.75 an ounce. The difference in these wide variations in prices, however, allows the exploiter who sells cinchophen under a trade-marked name to carry on an extensive advertising campaign and hypnotizes the medical profession into the belief that there is some esoteric value in the Atophan brand of cinchophen that does not reside in the non-trade marked cinchophens sold under the pharmacopeial name. As the Bayer concern has given the public the impression that the only genuine aspirin is that put out by it, so the advertising of Schering & Glatz seems to imply that the only genuine cinchophen is put out by Schering & Glatz; "If it's not S. & G.'s, it's not Atophan." This slogan, while technically true, because Schering & Glatz own the trade mark Atophan, is inferentially misleading in that the medical profession is likely to forget that Atophan is merely cinchophen. The way for physicians to show practical disapproval is simple: Prescribe the pharmacopeial cinchophen rather than the proprietary Atophan.]

1. The U. S. P. IX described the product under the name Acidum phenylcinchoninicum (phenylcinchoninic acid). Later the Chemical Foundation and the Council on Pharmacy and Chemistry adopted the coined nonproprietary name "Cinchophen," under which name it is described in the recently issued edition of the Pharmacopeia (U. S. P. X). The chemical name is 2 phenylquinolin-4-carboxylic acid.

2. For a number of years Atophan was included in New and Nonofficial Remedies, but in 1921 the Council on Pharmacy and Chemistry found the product no longer acceptable because of unwarranted therapeutic claims and for other reasons.

3. Leech, P. N.; Rabak, William; and Clark, A. H.: American Made Synthetic Drugs, II, Examination of Procain, Barbital, Phenetidyl, Acetphenetidin and Phenylcinchoninic Acid Manufactured Under Federal Trade Commission Licenses, J. A. M. A. **73**: 754 (Sept. 6) 1919; Ann. Rep. A. M. A. Chem. Laboratory **12**: 7, 1919.

4. The U. S. P. X requires that the ash from 0.2 gm. of cinchophen should be negligible. The term "negligible" is defined as a quantity less than 0.0005 gm.; hence the ash from cinchophen should not exceed 0.25 per cent. One specimen of cinchophen-Abbott yielded 0.36 per cent. ash. The ash appeared to consist of sodium sulphate. The two specimens of atophan were somewhat darker in color than prescribed by the U. S. P. X.

Correspondence

EDEMA IN MYOCARDIAL INSUFFICIENCY

To the Editor:—In THE JOURNAL, November 14, Resnik and Keefer call attention to the edema of the face sometimes seen in grave myocardial insufficiency. They conclude that it is probably due to impaired renal function, and cite studies of the nonprotein content of the blood as evidence for this conclusion.

If my understanding of their point of view is correct, they feel that the facial edema is of a different nature than that observed in the dependent portions: that the latter is the result of circulatory deficiency with stasis, and that the former is the result of kidney insufficiency produced by stasis in the kidney.

That the finding of increased amounts of nonprotein nitrogen in the blood of persons with severe myocardial failure is not absolute evidence of kidney insufficiency, and that the height of the retention is not an absolute index of the degree of kidney insufficiency is admitted by the authors

as they discuss the interrelation of the tissues and blood as well as those of the blood and kidneys in determining the height of the retention or even its presence or absence.

So little is known of tissue metabolism that it is dangerous to draw conclusions as to the rôle of the kidneys even in cases of so-called renal edema unassociated with cardiac disease. And in that type of renal disease associated with the greatest edemas, namely, nephrosis, there is no nitrogen retention at all.

Some recent observations in the use of the intradermal salt solution test as an index of tissue affinity for water throw some light on this problem. If 0.2 c.c. of 0.85 per cent. solution of sodium chlorid is injected intracutaneously over the shin, in the abdominal wall and over the deltoid muscle in a case of myocardial insufficiency, the rate of disappearance will be most rapid in the leg, less rapid in the abdomen, and slowest in the skin over the deltoid. Sixty minutes or more is usually required for the complete absorption of the injected fluid in normal persons. In cases of cardiac decompensation and edema of the dependent portions of the body, it is not at all unusual to get complete disappearance of the wheal from the skin over the deltoid in from twenty to thirty minutes when there is no demonstrable edema in this area. Edema usually appears in this condition when the salt solution disappearance time has dropped to twenty minutes or less.

Such observations show that there is an increased tissue affinity for water, a true pre-edema state in the tissues generally in myocardial insufficiency. Edema develops in the face or arm just as it develops in the more dependent structures when, because of deficient circulation locally, the tissues have an increased affinity for water. Naturally, this occurs only in the very severe types of failure and is usually a part of the terminal picture.

Is it not possible that this may be a more likely explanation than that of edema due specifically to kidney failure secondary to chronic passive congestion?

MILTON B. COHEN, M.D., Cleveland.

CONTROL OF UTERINE HEMORRHAGE BY THE ROENTGEN RAY

To the Editor:—The following report of a case may prove of interest in relation to the article by Dr. William S. Newcomet and the discussion by Dr. John H. Girvin (THE JOURNAL, November 7):

A married woman, aged 33, with three children living, was seen with Dr. J. I. Smith in 1920 because of uterine bleeding of more than a year's duration. For three or four months she had been confined to her bed and had to be carried to the office for the first roentgen-ray treatment. Examination was practically negative, revealing slight enlargement of the uterus and marked anemia. The previous history of the patient was unimportant. Treatment was given by means of the roentgen ray through two portals of entry anteriorly, with 9 inch spark gap, 5 milliamperes, 10 inch target distance, 4 mm. aluminum filter, ten minutes. This was repeated every twenty-one days for four treatments. Following the last treatment there was a temporary menopause for two or three months, when the patient again began to menstruate. About one year after the last treatment, she became pregnant. Dr. J. W. Crook, who attended her in her confinement, says that labor was normal, possibly a little premature, but that there was almost entire absence of the cranium of the fetus.

J. B. MASON, M.D., London, Ky.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

VITAMINS D AND E

To the Editor:—The editorial in THE JOURNAL, November 7, about vitamins is excellent; much of news in it and much of good advice for the busy practitioner. But what about the D and E vitamins? Most of us do not know anything about them. Please inform us of their proper effects, and where they are to be found. The E is said to be necessary for fecundation—to be an antisterility factor.

RICHARD HOGNER, M.D., Boston.

ANSWER.—Vitamin D is the designation now generally applied to the antirachitic vitamin to distinguish it from the fat-soluble vitamin A with which it is associated in certain antirachitic foods, such as cod liver oil. The evidence for this special identity of vitamin D was secured through demonstration that certain fats, such as butter fat, protect against or cure xerophthalmia, although they have at best feeble antirachitic potency; others, such as coconut oil, may facilitate the deposition of lime salts in bone, yet show none of the conventional potencies of vitamin A. The vitamin A may be destroyed in cod liver oil through aeration, so that the product will no longer cure ophthalmia, although its antirachitic characteristics are retained. Through irradiation with ultraviolet rays, food substances may acquire outspoken antirachitic potencies analogous to, if not identical with, vitamin D. These topics have repeatedly been discussed in THE JOURNAL. A tentative list showing the distribution of vitamins among common foods has just been published (Morse, W.: Applied Biochemistry, Philadelphia, W. B. Saunders Company, 1925, p. 919 ff.). The expression vitamin D as here used should not be confused with so-called bios, a substance promoting the growth of yeast and to which Funk earlier applied the designation D, which has not found widespread acceptance.

Vitamin E is the designation currently applied to a substance, or substances, heretofore also designated as reproductive vitamin, fertility vitamin, antisterility vitamin, substance X and vitamin X, in the absence of which the reproductive functions do not proceed normally, in certain species at least. Thus, if rats are brought up on diets consisting of purified food substances, inorganic salts and sources of vitamins A, B and D, they may fail to breed properly. Addition of small amounts of certain natural foods prevents this failure. In the female, the failure seems to be associated with a variety of disturbances of the sex organs; in the male, degenerative changes tend to occur in the testes and thus interfere with proper impregnation. The entire subject has scarcely received more than preliminary investigation. Recently Hart, Steenbock, Elvehjem and Waddell (*J. Biol. Chem.* **65**:67 [Aug.] 1925) have ventured criticisms of the current assertions, thus indicating that the problem still is *sub judice*. Among the more important papers dealing with it are the following:

Paul: *J. Physiol.* **34**: 14, 1906.
Hewer: *J. Physiol.* **47**: 479, 1914.
Allen: *Anat. Rec.* **16**: 93, 1919.
Mattill, H. A., and Conklin, R. E.: *J. Biol. Chem.* **44**: 137 (Oct.) 1920.
Dutcher, R. A., and Wilkins, S. D.: *Am. J. Physiol.* **57**: 437 (Oct.) 1921.
Meyerstein: *Virchows Arch. f. path. Anat.* **239**: 350, 1922.
Evans, H. M., and Bishop, K. S.: *J. Metabol. Research* **1**: 319 (Feb.), 335 (March) 1922. Evans, H. M., and Bishop, K. S.: *Science*, Dec. 8, 1922.
Eckstein: *Arch. f. d. ges. Physiol.* **201**: 16, 1923.
Mattill, H. A., and Stone, N. C.: *J. Biol. Chem.* **45**: 443 (March) 1923.
Nelson, V. E.: Heller, V. G., and Fulmer, E. I.: *J. Biol. Chem.* **57**: 415 (Sept.) 1923.
Evans, H. M., and Bishop, K. S.: *J. Metabol. Research* **3**: 233, 277 (Feb.) 1923.
Evans, H. M., and Bishop, K. S.: Existence of a Hitherto Unknown Dietary Factor Essential for Reproduction, THE JOURNAL, Sept. 15, 1923, p. 889.
Evans, H. M., and Bishop, K. S.: *Anat. Rec.* **27**: 203, 1924.
Sure, B.: *J. Biol. Chem.* **58**: 709, 1924.
Anderegg, L. T.: *J. Biol. Chem.* **59**: 587 (April) 1924.
Mattill, H. A.; Carman, J. S., and Clayton, M. M.: *J. Biol. Chem.* **61**: 729 (Oct.) 1924.
Miller, H. G., and Yates, W. W.: *J. Biol. Chem.* **62**: 259 (Nov.) 1924. Sure, B.: *J. Biol. Chem.* **62**: 371 (Dec.) 1924. Daniels, A. L., and Hutton, M. K.: *J. Biol. Chem.* **63**: 143 (Feb.) 1925.
Sure, B.: *J. Biol. Chem.* **63**: 211 (March) 1925.
Hart, E. B., and others: *J. Biol. Chem.* **65**: 67 (Aug.) 1925.
Evans: *Proc. Nat. Acad. Sc.* **11**: 373, 1925.
Mason: *Proc. Nat. Acad. Sc.* **11**: 377, 1925.

DESENSITIZATION TO ANTITOXIN

To the Editor:—I notice in Queries and Minor Notes (THE JOURNAL, October 24), the following answer:

"As tetanus antitoxin is conveyed in horse serum, there is a possible danger that one injection may sensitize the patient to horse proteins, and on that account it probably is best to desensitize before giving a second injection or series of injections in a given case, even if the interval is a long one."

How can desensitization thus be accomplished? M.D.

ANSWER.—To desensitize a patient to horse serum so as to minimize the danger of giving further injections, the usual procedure is to begin by giving a very small quantity of the serum to be used and gradually increasing the amount injected.

A 1:10 dilution of the serum in salt solution may be made; from 0.5 to 1 c.c. of this dilution is given hypodermically. Fifteen minutes later, 2 c.c. of this diluted serum is given and one-half hour after the first injection, 0.5 c.c. of the diluted serum is injected.

A fourth injection of 1 c.c. of undiluted serum is given one hour after the first, and two hours after the first dose the remainder of the desired amount of serum may be given.

In case sensitization is known to be of considerable degree by history or by skin tests, desensitization may be preceded by a hypodermic injection of from 1/150 to 1/100 grain (0.4 to 0.6 mg.) of atropin and a hypodermic of from 5 to 10 minims (0.3 to 0.6 c.c.) of epinephrin solution (1:1,000) be held in readiness to give if untoward symptoms follow the desensitizing injections. At the same time, the first dose of serum may be diminished.

If a history of horse asthma is present, desensitization should be attempted with much greater precaution and not more than 0.1 c.c. of a 1:100,000 dilution given as a first dose.

TUBERCULOSIS OF SPINE

To the Editor:—Will you kindly give me the most practical methods of treatment of tuberculosis of lumbar vertebrae which later formed an abscess in the inguinal region? This abscess was ruptured spontaneously and there is a sinus, about 10 inches long, leading from the opening toward the spine. The patient is a man, 28 years old, in good health. I saw him six weeks ago and have been trying to treat him with glycerin and iodoform, 10 per cent., and bismuth paste without any apparent improvement. All possible means to build up his health and resistance have been included with the local treatment. M.D.

ANSWER.—The treatment of tuberculosis of the lumbar spine resolves itself into two mutually reacting factors: hygienic, or improvement of the general health, and local protective measures for fixation of the diseased region. The greatest difficulty with the practitioner untrained in orthopedic methods is with the immobilizing part of the treatment. Continued recumbency is of first importance in taking the weight off the diseased vertebrae. The patient should be kept lying down without being allowed to sit up once for many months until all acute symptoms subside and the discharge is greatly diminished. Then he should gradually resume the sitting posture, using a reclining chair at first. During all this time his lumbar spine should be held immovable by a plaster cast extending from the axilla to the knee of the side with the psoas abscess. The Albee or Hibbs operations for fixing the spine may be used by experienced operators. Injections of sinuses have not generally been found curative. General surgical cleanliness of the wounds is all that they demand, as they are but superficial outlets for the deep lying disease.

CLIMATE FOR RHEUMATISM

To the Editor:—To what extent has "climate" an effect on the pain of so-called rheumatism and neuritis? After eliminating commonly accepted causes of such things there is a large class of patients who, as they approach middle life, complain a great deal of muscular stiffness, aches and pains of various kinds, pain that is worse after sundown, and before changes of dry to damp. They are generally easily stiffened up after a little unusual exercise; they have difficulty in lying in one position long at night, and so on ad infinitum. They are often people who have "worked hard" for a good many years. They have difficulty in sitting in one position, and get restless in church and like places. They are not crippled up. Elimination of focal infections, such as teeth and tonsils, seem to do them no good. Are these people just partially "worn out"? Would a change in climate make them more comfortable?

PAUL R. HOWARD, M.D., Kewanee, Ill.

ANSWER.—The symptoms described are suggestive of arteriosclerosis. Persons with the conditions mentioned do not tolerate well extremes of climate, either hot or cold, but might be benefited by sunny, warm and equable climate, which also has a favorable effect on rheumatic and neuritic pains.

Medical Education, Registration and Hospital Service

COMING EXAMINATIONS

ALABAMA: Montgomery, Jan. 12. Chairman, Dr. S. W. Welch, Montgomery.

ARIZONA: Phoenix, Jan. 5-6. Sec., Dr. W. O. Sweek, 404 Heard Bldg., Phoenix.

COLORADO: Denver, Jan. 5. Sec., Dr. David A. Strickler, 612 Empire Bldg., Denver.

DELAWARE: Wilmington, Dec. 8-9-10. Pres. Med. Coun., Dr. Henry W. Briggs, 1026 Jackson St., Wilmington.

DISTRICT OF COLUMBIA: Jan. 12. Sec., Dr. Edgar P. Copeland, Apt. 104, Stoneleigh Court, Washington, D. C.

HAWAII: Honolulu, Jan. 11. Sec., Dr. G. C. Milnor, 401 So. Beretania St., Honolulu.

ILLINOIS: Chicago, Jan. 19-21. Supt. of Reg., Mr. V. C. Michels, Springfield, Ill.

INDIANA: Indianapolis, Jan. 12. Sec., Dr. W. T. Gott, 421 State House, Indianapolis.

KENTUCKY: Louisville, Dec. 8-10. Sec., Dr. A. T. McCormack, 532 W. Main St., Louisville.

LOUISIANA: New Orleans, Dec. 10-12. Sec., Dr. Roy B. Harrison, 1507 Hibernia Bank Bldg., New Orleans.

MARYLAND: Baltimore, Dec. 8-11. Sec., Reg. Bd., Dr. Henry M. Fitzhugh, 1211 Cathedral St., Baltimore, Sec., Homeo. Bd., Dr. J. S. Garrison, 517 Old Orchard Rd., Baltimore.

MINNESOTA: Minneapolis, Jan. 5-7. Sec., Dr. Thomas S. McDavitt, 734 Lowry Bldg., St. Paul.

NORTH DAKOTA: Grand Forks, Jan. 5. Sec., Dr. George M. Williamson, Grand Forks.

OREGON: Portland, Jan. 5-7. Sec., Dr. U. C. Coe, 1208 Stevens Bldg., Portland.

RHODE ISLAND: Providence, Jan. 7. Sec., Dr. Byron U. Richards, State House, Providence.

SOUTH DAKOTA: Pierre, Jan. 19. Dir. Med. Licensure, Dr. H. R. Kenaston, Bonesteel.

UTAH: Salt Lake City, Jan. 5. Director of Reg., Mr. J. T. Hammond, 412 State Capitol Bldg., Salt Lake City.

VIRGINIA: Richmond, Dec. 8-11. Sec., Dr. J. W. Preston, 720 Shenandoah Life Bldg., Roanoke.

WASHINGTON: Olympia, Jan. 12. Sec., Mr. William Melville, 15 Insurance Bldg., Olympia.

WISCONSIN: Madison, Jan. 12-14. Sec., Dr. Robert E. Flynn, 315 State Bank Bldg., La Crosse.

WISCONSIN: Milwaukee, *Basic Sciences*, Dec. 18-19. Sec., M. F. Guyer, Madison.

Wisconsin June-July Examination

Dr. Robert E. Flynn, secretary of the Wisconsin Board of Medical Examiners, reports the written and practical examination held at Milwaukee, June 30 and July 1-2, 1925. The examination covered 18 subjects and included 100 questions. An average of 75 per cent. was required to pass. Of the 111 candidates examined, 91, including 6 osteopaths, passed, and 20, including 8 osteopaths, failed. Twenty-one candidates, including 1 osteopath and 1 undergraduate, were licensed by reciprocity. Two candidates were granted new licenses in exchange for previous certificates of registration. The following colleges were represented:

College PASSED	Year Grad.	Per Cent.
University of California Medical School	(1925)	83.6
Howard University School of Medicine	(1925)	86.8
Northwestern University Medical School (1925)* 85.2, 87.6, 89.4, 90.3, 90.4	(1924)	84.3
Rush Medical College (1925) 84.4, 84.9, 90.1, (1925)* 90, 91	(1924)	86.5
University of Illinois College of Medicine (1925)* 84.1, 88.8, 89.7, 91	(1925)	86.2, 86.9,
Detroit College of Medicine and Surgery	(1923)	82.5
University of Michigan Medical School	(1925)	84.3
University of Minnesota Medical School	(1924)	85, 86
Washington University School of Medicine	(1922)	87.1
University of Pennsylvania School of Medicine (1925) 85.3, 86.1, 87.1, 87.2, 91.2	(1924)	84.4,
Marquette University School of Medicine 82.6, 82.7, 82.8, 83, 83.3, 83.6, 83.6, 83.9, 84, 84.1, 84.1, 84.1, 84.4, 84.6, 84.7, 84.8, 85.3, 85.5, 85.8, 86.3, 86.8, 86.8, 86.8, 86.9, 86.9, 86.9, 87.5, 87.7, 87.7, 87.8, 87.8, 87.9, 88.2, 88.6, 88.7, 88.9, 89.2, 89.2, 89.2, 89.3, 89.9, 90.2, 90.4, 93	(1925)*	80.2, 80.8, 80.9, 82.3,
Queen's University Faculty of Medicine	(1924)	87.7
University of Toronto, Faculty of Medicine	(1923)	86.9
University of Western Ontario Medical School	(1924)	84.5
University of Vienna, Austria	(1918)†	89.2
University of Freiburg, Germany	(1908)†	79.3
Osteopaths 81, 84.4, 84.9, 86.8, 88.5, 91‡		

College FAILED	Year Grad.	Number Failed
Chicago College of Medicine and Surgery	(1917)	1
Washington University School of Medicine	(1924)	1
Marquette University School of Medicine	(1925)*	1
Milwaukee Medical College	(1908)	1
University of Vienna, Austria	(1910)† (1922)†	2

University of Berlin, Germany	(1922)†	1
University of Bonn, Germany	(1923)†	1
University of Jena, Germany	(1917)†	1
University of Wurzburg, Germany	(1923)†	1
University of Athens, Greece	(1916)†	1
University of Budapest, Hungary	(1912)	1
Osteopaths		8

College	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Northwestern University Medical School		(1904)	Illinois
Rush Medical College	(1922), (1923), (1924),	(1925)	Illinois
University of Illinois Coll. of Med.	(1917) Minnesota,	(1924)	Illinois
State University of Iowa, College of Medicine		(1905)	Iowa
Johns Hopkins University Medical Department		(1916)	Minnesota
University of Maryland School of Medicine		(1915)	Maryland
University of Michigan Medical School	(1917),	(1919)	Michigan
Minneapolis College of Physicians and Surgeons		(1897)	Iowa
University of Minnesota Medical School		(1902)	Minnesota
Jefferson Medical College of Philadelphia		(1918)	Illinois
Meharry Medical College	(1916),	(1922)	Tennessee
University of Texas Department of Medicine		(1913)	Texas
University of Heidelberg, Germany		(1920)†	Colorado
Osteopath			Missouri
Undergraduate			Texas

* These candidates have finished their medical course and will receive their M.D. degrees on completion of a year's internship in a hospital.

† Graduation not verified by the American Medical Association.

‡ This candidate is a licensed osteopath, who received his license to practice surgery after this examination.

Book Notices

THE MECHANISM AND GRAPHIC REGISTRATION OF THE HEART BEAT. By Sir Thomas Lewis, M.D., F.R.S., F.R.C.P., Physician of the Staff of the Medical Research Council. Third edition. Cloth. Price, 50 shillings. Pp. 529, with 400 illustrations. London: Shaw & Sons, Ltd., 1925.

This is really a new edition and not simply a reprint of the previous edition, with slight changes. We may quote from the publisher's announcement the following facts that are borne out by an examination of the volume: Three of the original chapters have been omitted and eight new chapters have been added. Much new material has been incorporated into other chapters. Much of the old text has been compressed. Altogether there are sixty more pages than in the former edition. The book has been brought down to date. There is full consideration of circus movement, the action of quinidin, the origin of extrasystolic disturbances, and the theory of heart block. We may add that the commanding position occupied by Lewis as an authority on the heart, his gift of clear writing, and the excellent work of the publishers, make this a book that students of heart problems will be eager to own and read.

THE PHYSIOLOGY OF MIND. An Interpretation Based on Biological, Morphological, Physical and Chemical Considerations. By Francis X. Dercum, A.M., M.D., Ph.D., Professor of Nervous and Mental Diseases in the Jefferson Medical College. Second edition. Cloth. Price, $3.50 net. Pp. 287. Philadelphia: W. B. Saunders Company, 1925.

The mind is a form of reaction to the stimuli of the environment. These stimuli act on the organism of the sentient world in a uniform manner predetermined by the laws of physics and chemistry. The reception of these stimuli in unicellular organisms causes reactions of a minimal variety. As the receiving and reacting organism gains in complexity, the determined reactions gain in variety. Variety is enhanced by the interposition of a transmitting, or nervous, system, which conducts the reactions of the receptor elements to the effector elements. In the oldest types and portions of the nervous system, the pathways of this transmission are fixed. They handle those situations to which the term instinctive may be applied. The tropisms of the simpler forms are clearly their reactions to the forces of the environment: reactions determined by the physical nature of the stimuli. Yet some of these reactions seem to be the result of conscious or deliberate choice. When the pathways of transmission are simple the effector responses are simple, as in the lower forms of life with the segmental type of brain: the nose brain, the eye brain, the ear brain, the skin brain and the visceral brain. In the higher forms, there is in addition to this segmental brain the neo-encephalon or telencephalon. In this structure the pathways are not fixed, and the potentialities for reaction are numerous, variable and adaptable. This variability is served and in part explained by the ameboidism of the cortical neurons, which allows an impulse to pass over any one of a number of pathways. This impulse is of an electrical nature. Consciousness is present when the pathways of transmission are variable, not when they are fixed; it is a phenomenon of cortical or telencephalon transmission. Stimuli tend to traverse the same pathways. As these pathways become more and more fixed, consciousness diminishes. If a pathway in the telencephalon has been once used, its subsequent image is aided by the memory of the first passage. Frequent and unchanging passage over a certain pathway tends toward fixing the character of the reaction; it approaches the level of the instinct. In the brain of transmission consciousness is of dynamic power; attention, it is believed, is not invaded by that which is of low dynamic power. The functions of the segmental brain of the lower forms are performed by the thalamus. The pathways to and from the thalamus and the cortex are of great importance. Sensations, feelings and emotions, the products of thalamic activity, are transmitted to the cortex. If they are of sufficient dynamic power, they invade the stream of consciousness. However, the dynamic power of the brain of cortical transmission, the stream of consciousness, is of such a scale of dynamic force that it usually dominates the activity of the thalamus. The striatum is concerned with fixed associations. It takes over from the cortex many of the controls originally present in consciousness. Frequent repetition, as in walking and in speech, leads to fixed reactions; as these lose their variability and become fixed, the striatum assumes them and they cease to be represented in consciousness. Transmission depends on the condition of the neuronic pathways. The metabolism of the neuron is profoundly influenced by the hormones of the endocrine glands. The thyroid, the pituitary and the chromaffin system dominate during periods of activity; the thymus, the parathyroids and the pancreas are of more importance during periods of reconstructive rest. The activities of these glands are of great importance in influencing the functions of the thalamus. Hormonic activity is of great importance in determining tropisms and instincts. If stimuli enter the thalamus and there activate an aggregation of neurones, and if the transmission occurs from this aggregation to the cortex, the proper neurons in the cortex must respond, or the transmission that occurs back to the thalamus will arouse a sense of pain; if the proper combinations are effected, a sense of pleasure will arise. Impressions from the physical world are constantly required to correct or check cortical activities. All matter is in motion; hence it must be regarded as of four dimensions, the three of space plus that of time. This is true of living as of inorganic matter.

After a study of this little book, the entire field of mental life seems simple; receptor, transmission and effector—and the awareness is an attribute of the complexities of the transmission. In the addendum, thirty-five pages are devoted to an exposition of the mechanisms that underlie psychopathology. Thoughts and actions that are the symptoms of hysteria are due to the inability of the patient to check or redirect the train of neuronic activity suggested, from no matter what source. In dreams, deliria and confused states, the train of transmission is faulty and remains uncorrected by impressions from the external, objective world. In those states termed degenerative, such as dementia praecox, an adynamia or feebleness of transmission is postulated, and the supporting metabolic background also being weak, the imperfectly constituted neurons gradually deteriorate. In that type of mental disturbance in which disorders of feeling appear to be more basic than those of conscious thinking, malfunctioning of the aggregations of neurons in the thalamus is assumed. As a result, the cortical supply of information of the world outside consciousness is faulty. Hence abnormal cortical or conscious activity is predetermined. In melancholia, synaptic transmissibility is diminished by faulty hormonic influence of the endocrine glands; in mania, it is increased. In the last few pages of the volume, which precede a comprehensive index, freudism is swept into the rubbish heap with a gesture suggestive of intolerant authority.

This book is the work of an authority who has gathered together the established facts of the fundamental sciences and from them drawn conclusions as to the working of that

intangible function or thing, the mind. Of necessity there are unbridgable gaps between the material—the physical and the chemical—and the immaterial—the mental and the spiritual. These gaps, like those postulated at the synapses, can be closed only by the functioning of consciousness. This functioning is energy, and if energy is thought of as material, then the material continuum extends directly into the mental. This volume might very well serve as a textbook for the student to whom dogmatic facts must be served, who must have something fixed that he can grasp, not something as fluid as the progress of knowledge. By those to whom this progress seems as important as the facts garnered on the way, some statement of such progress would be appreciated.

TRAITEMENT DES FRACTURES ET LUXATIONS DES MEMBRES. Par Jacques Leveuf, Chirurgien des hôpitaux de Paris et Ch. Girode-P. Mornard-Raoul Monod, Chefs de clinique à la Faculté de médecine de Paris. Préface du Pr. Pierre Delbet. Paper. Price 25 francs. Pp. 464, with 247 illustrations. Paris: Masson et Cie, 1925.

The nonoperative treatment of fractures is first taken up in detail. The use of Delbet's splints on the lower extremities, which permit early weight bearing and movement in the joints, is advocated, but proper application is necessary and appears rather difficult. Luxations are considered in a brief but descriptive section. The operative indications and technic for each fracture are given in a separate section. The advisability of putting in a foreign body and the type best suited for holding each fracture are discussed at length. There are well chosen illustrations of operative technic and the use of splints. The authors are conservative and advocate operative reduction of fractures only when other methods have failed.

EARLY CONCEPTIONS AND TESTS OF INTELLIGENCE. By Joseph Peterson, Ph.D., Professor of Psychology, George Peabody College for Teachers. Cloth. Price, $2.16. Pp. 320. Chicago: World Book Company, 1925.

Within quite recent times tests of intelligence have come to play an important part not only in psychologic and psychiatric work but also in social, pedagogic and industrial life in general. So rapid and overwhelming have been their growth and acceptance that it is difficult to think of getting along without them, even though there are still wide divergences of opinion as to their exact value. Yet, it is a fact that many persons, even among those who employ such test methods daily, have little or no knowledge of their origin and evolution. Nevertheless, much is to be learned in this as in other fields of scientific work from a study of the historical background and the difficulties overcome. Dr. Terman is unquestionably right when he states in an introduction to the book that lack of this information is frequently the cause of misunderstandings and of inaccuracies of application and interpretation of the results of tests. The task of supplying this deficiency in a form suitable for college students has been undertaken with admirable success by Dr. Peterson. The story of the concept of intelligence is traced with excellent selection of data from the earliest Greek writers down to the time of the death of Binet in 1911. The work of this French genius and his collaborators of necessity occupies a large place in this volume, though full appreciation is accorded to other investigators in many countries. To Binet belongs the credit of initiating and establishing tests designed to estimate general as opposed to special abilities to which most of his predecessors had devoted their efforts. The criticisms and objections of contemporaries are outlined in simple language by Dr. Peterson without bias or partisanship. The book is written in simple, readable style, the selections of facts are made evidently by one who is thoroughly conversant with his subject, and there is a praiseworthy absence of dogmatism or overenthusiasm. At the end of each chapter, problems are proposed that require wider reading for their solution and lead the student into thinking for himself; the bibliography is admirable. The book is a distinct contribution to education in psychology, a subject from which unfortunately too many physicians have held aloof, and can be recommended without hesitation to every one who is in any way interested in the giving or interpreting of intelligence tests.

Medicolegal

Test of Hospital Being a Charitable Institution

(Nuns of Third Order of St. Dominic v. Younkin et al. (Kan.), 235 Pac. R. 869)

The Supreme Court of Kansas, in reversing a judgment that was rendered for the defendants, and directing that one be entered instead for the plaintiff, in this suit to enjoin county officials from levying and collecting taxes on a hospital owned by the plaintiff, says that the test which determines whether a hospital is charitable is whether it is maintained for gain or profit. If a hospital is conducted for the use and profit of persons engaged in the practice of medicine and surgery, or as an adjunct to a medical college conducted for the profit of its owners, it cannot be regarded as a charitable institution, and is subject to taxation. But when an institution is incorporated for benevolent purposes without capital stock, and no dividends are declared or paid, and it conducts a hospital, and all the earnings of the hospital from pay patients, gifts, devises, bequests or whatever source are used in the maintenance, extension and improvement of the hospital, which admits patients without regard to race, creed or wealth, it is uniformly held that such hospital is conducted exclusively for charitable purposes. The fact that it charges and receives pay for patients able to pay does not detract from the charitable nature of the service rendered. Nor does the fact that the hospital has been able to increase the value of the plant from money received from pay patients and donations detract from its charitable purposes. If these incomes from pay patients and donations are used for the purpose of caring for or relieving the sick or disabled and increasing the facility of the institution for that purpose, and are not used for the purpose of declaring dividends or the financial profit (other than the paying of necessary operating expenses) of those connected with or having charge of the institution such use is simply an extended use for charitable purposes.

Validity of Sterilization Law—Physicians to Testify

(Smith v. Command, Probate Judge (Mich.), 204 N. W. R. 140)

The Supreme Court of Michigan holds that Act 285, Public Acts of Michigan of 1923, designed to authorize the sterilization of mentally defective persons, deemed to include idiots, imbeciles and the feebleminded but not the insane, is—measured by the purpose for which it was enacted and the conditions that warranted it, and justified by the findings of biologic science—a proper and reasonable exercise of the police power of the state. The statute does not violate the constitutional provision that cruel or unusual punishment shall not be inflicted, there being no element of punishment involved in the sterilization of feebleminded persons. In this respect it is analogous to compulsory vaccination. Both are nonpunitive. It is therefore plainly apparent that the constitutional inhibition against cruel or unusual punishment has no application to the surgical treatment of feebleminded persons. It has reference only to punishments inflicted after convictions of crimes. The methods provided by the statute to accomplish its purpose are not cruel or inhuman. It requires treatment by roentgen rays or the operation of vasectomy on males or salpingectomy on females, or other treatment as may be least dangerous to life. It is clearly apparent that the methods provided by the statute for carrying out its purpose are not unreasonable, cruel or oppressive, and that the results are beneficial both to the subject and to society.

Nor does the statute make an unconstitutional classification in excepting the insane. In making this classification the legislature did not carve a class out of a class, but took a natural class of defectives whose children would have an inherited tendency to feeblemindedness. It is as reasonable and no more class legislation than the compulsory vaccination of those who have been exposed to smallpox. The feebleminded include distinct types of which the imbeciles and idiots are lower orders. The insane do not belong in this

class, and there are apparent good and substantial reasons why the legislature differentiated between them. It is reasonable to suppose that the legislature knew that the insane have less of the sexual impulses than the feebleminded, and that biologic science has not so definitely demonstrated their inheritable tendencies. But the second division of the classification, bringing within the operation of the law only those of the feebleminded class who are unable to support any children they might have, and whose children probably would become public charges by reason thereof, carves a class out of a class and is subject to constitutional objection. However, the first division being a complete classification in itself, its constitutionality is not in any way affected by that of the second. Furthermore, this statute does not violate the "due process of law" clause of the constitution, nor the provision of the state constitution that institutions for the benefit of the feebleminded shall always be fostered and supported. In the opinion of the legislature, additional legislation was needed to prevent the spread of feeblemindedness. In terms the statute specifically applies to inmates of such institutions.

There is no provision for the filing of certificates made by the physicians. The procedure is in no way similar to that provided for on petitions to commit to an insane asylum. The intent is clear that the physicians shall appear in court at the hearing and submit to an examination by the court, the prosecuting attorney, the guardian or other person on whom notice has been served. The certificates filed in this case were simply statements in the language of the statute that the facts were present which the court must find to warrant making the order appointing a competent physician to treat the plaintiff by roentgen rays, or by vasectomy, or by other treatment that may be least dangerous to life, in order to render him incapable of procreation. It is not for the physicians to determine the question before the court. While, of course, they may express their opinions concerning it, the reasons for such opinions should be inquired into in order that the court may, after due consideration thereof and of the proof submitted, as provided for in the statute, determine whether the person examined should be dealt with under the terms of the act. No more important duty devolves on a probate judge than that imposed on him under this act. The responsibility of determining that a surgical operation shall be performed on a human being who is mentally defective "for his own welfare or the welfare of the community" rests on him, and it may properly be discharged by him only on the most painstaking and thorough investigation of the facts disclosed on the hearing.

Validity of Disposition of Property by Aged Persons

(Coughlin et al. v. St. Patrick's Church of Tama (Iowa), 203 N. W. R. 812)

The Supreme Court of Iowa, in holding valid the disposition which one Coughlin made of his property when he had reached a time in life and was in a physical condition in which he knew he could not live very long, says that mere old age and a certain degree of physical and mental impairment incident thereto are not sufficient in the law to deprive one of the capacity to convey property by deed or will. While courts should be and are zealous to see that the weak and frail are not overreached or taken advantage of, they must be equally zealous to guard the right of every man to dispose of his own property as he sees fit, provided he has sufficient mental capacity to know what property he possesses, and what he desires to do with it, and exercises his free and voluntary will in the disposition of it. It is inevitable that, as a general rule, physical weakness is incident to the approach of old age, and there is of necessity a degree of deterioration of the mental faculties. The step becomes slow and halting and the eyes lose their luster with the onward course of time. Forgetfulness almost inevitably comes as one approaches the shadows of life. The symptoms are familiar and well known. These and other evidences of old age may advance to such a degree that senility results. The mind may be broken and helpless and the person the easy prey of the designing and vicious, and the party may be incompetent to transact business affairs with conscious appreciation of their extent or attendant results. But a disposition of one's property is not to be set aside on the ground of mental incapacity unless the evidence is of such a character as to convince and satisfy a court of equity that the grantor was so lacking in mental ability that he could not reasonably exercise judgment and discretion in regard to the particular business in hand. The shrewdness and alertness of strenuous business competition is not required. Men in good mental condition err in judgment in business transactions, and it is not unknown that financial disasters frequently result. Business transactions are often ill advised, and no hard and fast rule can be laid down by which to measure the exercise of judgment and discretion by one in disposing of his property.

Nonmailable Advertisement of Lying-In Institution

(Dysart v. United States (U. S.), 4 Fed. R. (2d) 765)

The United States Circuit Court of Appeals, Fifth Circuit, in affirming a judgment of conviction of defendant Dysart, who was charged with having knowingly deposited and caused to be deposited in a post office for mailing a letter and printed card inclosed in an envelop, which letter and card were alleged to be obscene, lewd and lascivious, says that the vicious tendency of a letter or publication in question may be the result of innuendo or suggestion, of its being so devised as to have capacity to give rise to illicit sexual desires or thoughts. In behalf of the accused it was contended that the charged advertising of his maternity or lying-in institution was incapable of having such a tendency. It is not doubted that it is permissible to use the mails in making known the existence and claimed merits of such an institution. But an advertisement of such an institution is nonmailable if it is so devised as to serve the purpose of implanting lewd or lascivious thoughts in the minds of those to whose notice it is directly brought. The court thinks that a denial of the power or influence of suggestion would be involved in affirming that statements to the effect that a named institution is a private retreat for unmarried pregnant women coming from the best families and affords to such females a convenient means of concealing the results of their missteps is incapable of giving rise to sexual thoughts or desires in the minds of unmarried females to whose notice such statements are brought. Commendation of existing facilities for avoiding possible unpleasant social consequences of conduct in pursuance of illicit sexual desires may be the means of covertly suggesting such desires to those whose actions are largely the result of social influences and restraints. The method adopted to bring to the notice of unmarried females an institution described as "specially a private retreat for unmarried pregnant women" may be inconsistent with customary standards of decency, though the use of indecent or obscene language is avoided.

Society Proceedings

COMING MEETINGS

American Pharmacological Society, Cleveland, Dec. 28-31. Dr. E. D. Brown, University of Minnesota, Minneapolis, Minn., Secretary.

American Physiological Society, Cleveland, Dec. 29-31. Dr. W. J. Meek, Science Hall, Madison, Wis., Secretary.

American Society for Experimental Pathology, Cleveland, Dec. 28-30. Dr. E. B. Krumbhaar, Philadelphia General Hospital, Philadelphia, Sec'y.

American Society of Biological Chemistry, Cleveland, Dec. 28-30. Dr. D. W. Wilson, University of Pennsylvania School of Medicine, Philadelphia, Secretary.

Federation of American Societies for Experimental Biology, Cleveland, Dec. 29-31. Dr. Walter J. Meek, Science Hall, Madison, Wis., Sec'y.

Isthmian Canal Zone, Medical Association of, Ancon, Jan. 19. Dr. David L. Robeson, Ancon Hospital, Ancon, Secretary.

Philippine Islands Medical Association, Manila, Dec. 16-19. Dr. Isabelo Concepcion, College of Medicine and Surgery, Manila, Secretary.

Porto Rico, Medical Association of, Coami, Dec. 14-15. Dr. R. M. Suarez, Box 314, Santurce, Secretary.

Radiological Society of North America, Cleveland, Dec. 7-11. Dr. Robert J. May, St. Luke's Hospital, Cleveland, Secretary.

Society of American Bacteriologists, Madison, Wis., Dec. 29-31. Dr. James M. Sherman, Cornell University, Ithaca, N. Y., Secretary.

Southern Surgical Association, Louisville, Ky., Dec. 15-17. Dr. Hubert A. Royster, 423 Fayetteville Street, Raleigh, N. C., Secretary.

Western Surgical Association, Wichita, Kan., Dec. 18-19. Dr. Harry P. Ritchie, Lowry Building, St. Paul, Minn., Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to Fellows of the Association and to individual subscribers to THE JOURNAL for a period of three days. No foreign journals are available prior to 1920, nor domestic prior to 1923. Periodicals published by the American Medical Association are not available for lending, but may be supplied on order. Requests should be accompanied by stamps to cover postage (6 cents if one and 12 cents if two periodicals are requested).

Titles marked with an asterisk (*) are abstracted below.

American Journal of Electrotherapeutics and Radiology, New York

43: 327-358 (Sept.) 1925

Factors in Establishment of Sound Physiotherapeutic Practice. W. T. Johnson, Philadelphia.—p. 329.
Hemorrhoids and Anal Fissures with Special Reference to Desiccation Method of Treatment. W. I. Clark, Philadelphia.—p. 329.
Electrosurgery. W. D. McFee, Haverhill, Mass.—p. 331.
Terminology of Electrothermic Methods. J. D. Morgan, Philadelphia. —p. 335.
History of American Electrotherapeutic Association. E. B. Snow and G. B. Massey, Philadelphia.—p. 338.

American Journal of Medical Sciences, Philadelphia

170: 469-624 (Oct.) 1925

Relationship of Sympathetic Innervation to Tone of Skeletal Muscle. J. I. Hunter, Sydney, Australia.—p. 469.
*Cancer. II. Human Intestinal Parasites as Cancer Inciting Factor: Significance of Precancerous State. W. Meyer, New York.—p. 481.
*Carcinoma of Esophagus. W. C. Buchbinder, Chicago.—p. 496.
*Form of Acute Hemolytic Anemia Probably of Infectious Origin. M. Lederer, Brooklyn, N. Y.—p. 500.
*Clinical Value of Some Recent Tests for Liver Function. H. F. Shattuck, J. C. Browne and M. Preston, New York.—p. 510.
*Icterus Index. J. V. Barrow, E. L. Armstrong and W. H. Olds, Los Angeles.—p. 519.
*Mitral Stenosis After Fifth Decade of Life. E. P. Boas and D. Perla, New York.—p. 529.
*Atypical Tabes Dorsalis (Forme Frusté). A. E. Bennett, Omaha.—p. 538.
Glucose Tolerance Tests in Children. M. E. Fries and J. L. Kohn, New York.—p. 547.
Body Weight in Relation to Health and Disease. E. S. DuBray, San Francisco.—p. 564.
Physical Defects as Revealed by Periodic Health Examinations. L. I. Dublin, E. L. Fisk and E. W. Kopf, New York.—p. 576.

Human Intestinal Parasites and Cancer.—Meyer says that numerous, and among themselves unrelated, factors, when impinging on human tissue, are apt to irritate it and to set up therein a chronic morbid condition, from which a sequence of events culminating in cancer has been observed sometimes to arise. Such potentially cancerous conditions have, therefore, been termed a "precancerous state" and the factors inducing them, "cancer inciting factors." Cancer inciting factors, while capable of initiating a precancerous state, evidently do not govern the behavior of the tissue during this state, for the suspicious condition of the tissue may be aggravated, or it may become stationary, or it may recede after the initiatory irritation has ceased to exist. A precancerous state appears always to be interposed between the taking effect of the cancer inciting factor and the state of malignancy, so that in all probability there is no direct relation, if any, of the two events to each other as of cause and effect. The primary irritant, the cancer inciting factor, is not a "cause of cancer." There is no knowing whether the chronic condition which it may initiate under certain circumstances in the tissue will ever mature into definite malignancy, or will not do so.

Carcinoma of Esophagus.—In a series of fifty-four necropsies in cases of carcinoma of the esophagus, one third of the esophagus was involved by the tumor growth. Buchbinder says that evidence that the disease begins at the site of the tracheal bifurcation is only presumptive. There is some relation between carcinoma of the esophagus and the region of the bifurcation. Either the growth originates there or spreads more rapidly into it. It is quite impossible to recognize the so-called early case. At the time of the first complaint of the patient, there may already be extensive metastatic infection. The average computed life history of the disease is five and one-half months.

Acute Hemolytic Anemia of Infectious Origin.—Three cases of a type hitherto undescribed in the available literature, characterized by sudden onset, fever, leukocytosis and severe anemia, are described by Lederer. Alterations in the blood similar to those seen in pernicious anemia were found. Evidences of rapid and enormous blood destruction were present. The behavior suggests an infection with selective action concentrated on the reticulo-endothelial system. Prompt and permanent recovery followed a single transfusion of unmodified blood.

Value of Liver Function Tests.—The studies on liver function tests made by Shattuck, Browne and Preston would seem to indicate that the icterus index is the most useful single functional liver test for clinical work. The Rowntree-Rosenthal dye test is of supplementary value in measuring liver function. For clinical work it is more complicated, more objectionable to the patient and may not be entirely free from danger. The Fouchet test proved unreliable for detecting minor grades of bilirubinemia. In other respects the van den Bergh test serves very well in its place. The van den Bergh test has distinct value in studying liver function, but the extent must be determined by the icterus index or dye test. It helps as a specific qualitative test for bile pigment to control readings of the icterus index in the zone of latent jaundice. It distinguishes between hemolytic and obstructive jaundice.

Icterus Index Best Test of Liver Function.—Barrow, Armstrong and Olds assert that the icterus index is the test of choice for the quantitative estimation of bilirubinemia for the reason that it is simple, accurate, and of definite clinical value. There is no untoward effect or danger to the patient in its use. The Widal hemoclastic crisis probably tests the proteopexic function of the liver, which is allied to, but different from, the bile forming function. Liver function is probably closely associated with the behavior of the blood stream leukocytes. Both of these come under the influence of any foreign protein introduced either through the intestinal tract or through the tissues elsewhere. It seems probable that the leukocyte tests of today may be in reality liver function tests. Extreme leukocytosis in the presence of bile is probably the result of a high grade hemopoietic stimulant acting not because of the presence of bile, but in spite of it. The icterus index is, in the last analysis, a measure of bilirubin in the blood stream. Its clinical interpretation must depend on all the factors that will produce this condition. It is a valuable aid in diagnosis, prognosis and treatment. The test is neither infallible nor specific in the diagnosis of any one disease, but as other clinical tests are rated, this one has a high marking.

Age Incidence of Mitral Stenosis.—An analysis made by Boas and Perla of 183 cases of mitral stenosis shows that mitral stenosis is not uncommon in the sixth and seventh decades of life. In most instances it is the end-result of a rheumatic infection in childhood or early adult life. The mitral narrowing is not extreme, and the lesion is nonprogressive or very slowly progressive, so that significant symptoms do not develop for many years. Women with such a condition may apparently undergo many pregnancies without distress and without injury to the heart. In a certain number of cases of mitral stenosis in elderly persons, the valvular lesion cannot be interpreted as the end-result of an ancient endocarditis, but must be regarded as a primary artherosclerosis of the mitral valve, and particularly of the auriculoventricular ring. The characteristic pathologic finding is a widespread calcification of the mitral ring encroaching on the lumen of the auriculoventricular opening with thickening and, at times, calcification and fusion of the valve cusps.

Atypical Tabes Dorsalis.—Bennett is of the opinion that atypical, or "forme frusté" type, tabes is the most frequently missed form of the disease. Gastric crisis in this variety often leads to unnecessary abdominal operations. Incomplete histories, careless examinations and infrequent spinal punctures in doubtful cases account for most errors. Gastric crises occur in from 10 to 20 per cent. of all cases of tabes dorsalis. Reliable reports indicate that more than 10 per cent. of tabetics have needless operations performed at least once

on account of a mistaken diagnosis. There are frequent reports in the literature of patients having had four or five abdominal operations when the cause of the symptoms was root pains of syphilis. The classic signs of tabes are absent in approximately one-half the early cases, when abdominal pains may be present. The knee jerks are normal or exaggerated in at least 25 per cent. of early cases. The same applied to ataxia, Argyll-Robertson phenomenon and other later signs. Approximately 10 per cent. of the patients remain atypical throughout the entire course of the disease. A complete life story of the individual with a careful neurologic examination and a spinal fluid study should be made when there is the slightest doubt as to a diagnosis. In patients presenting recurrent abdominal attacks with no relief from previous operations, the possibility of an atypical form of tabes dorsalis should be very firmly impressed on the minds of surgeons in order to decrease the all too frequent incidence of unnecessary operations on tabetics.

American Journal of Obstetrics and Gynecology, St. Louis

10: 461-618 (Oct.) 1925

*Inguinal Endometriosis (Often Reported as Endometrial Tissue in Groin, Adenomyoma in Groin, and Adenomyoma of Round Ligament). J. A. Sampson, Albany, N. Y.—p. 462.

An Illustrated History of Low or Cervical Cesarean Sections. J. B. De Lee, Chicago.—p. 503.

*Puerperal Infections and Their Treatment. J. O. Polak, Brooklyn.—p. 521.

*Influence of Male Sex Gland on Female; Determination of Sex Ratio of Offspring. F. Kovacs, Baltimore.—p. 527.

*Cystic Lesions of Possible Endometrial Origin in Appendix; Four Cases. G. W. Outerbridge, Philadelphia.—p. 545.

*Purpura Complicating Pregnancy. S. Rushmore, Boston.—p. 553.

Treatment of Uterine Fibromyomas. J. G. Clark and F. B. Block, Philadelphia.—p. 560.

Deities Concerned with Childbirth Among Ancient Peoples. E. A. Shumann, Philadelphia.—p. 570.

Inguinal Endometriosis.—In eight cases of endometriosis of the intraperitoneal portion of the round ligament (so-called "adenomyoma" of that structure) reported by Sampson, a similar invasion of other pelvic structures was also present. The distribution of these lesions was similar to that found in the implantation of cancer in peritoneal carcinosis secondary to carcinoma of the pelvic organs. In four of these cases, an endometrial hematoma of one of the ovaries was also present (both ovaries in one patient). In three others a small amount of endometrial tissue was present in one or both ovaries, with the development of an endometrial cyst or hematoma. In the remaining one, endometrial tissue was not found in either ovary. Sampson believes that in all eight cases the peritoneal endometriosis was mainly of implantation origin, primarily from epithelium carried through the tubes during menstruation, and secondarily from the menstrual reaction of endometrial foci on the surface of the peritoneum or the perforation of an ovarian hematoma. A study of the whole subject of pelvic endometriosis suggests that at times metastasis occurs through the lymph vessels and possibly through the vein, and that endometrial tissue may reach the groin and other parts of the body through these channels.

Chemotherapy of Puerperal Infection Ineffective.—Polak discusses the value of acriflavine, gentian violet and mercurochrome-220 soluble in the treatment of puerperal infection. It is his firm belief that the patients supposed to have recovered as a result of the employment of injections of these chemical solutions would have done so from the intravenous injection of any foreign or protein substance; for it is well known that such intravenous medication will always raise the leukocyte resistance temporarily, but fails to maintain it. The puerpera who recovers from a puerperal infection, whether it be in the blood stream or in the local tissues, does so as a result of a reaction sufficient to inhibit the further growth of the bacterial invader. It has been shown, experimentally and clinically, that these dyes in a concentration of 1:10,000, which is the highest concentration compatible with life, irritate the liver, kidney and heart, and this results in a definite pathologic change in each of these organs; that the intravenous use of these dyes will give only a temporary increase in the leukocytosis, and that this increase is not maintained for a longer period than twenty-four hours. On the other hand, blood transfusion does increase the cellular elements of the blood, its alkalinity and the alkalinity of the tissue fluids and thus increases the reaction against bacteria, as well as improving the function of the several eliminative organs.

Influence of Male Sex Gland on Female.—An experimental study was made by Kovacs to determine the sex ratio of the offspring. He found that it can be changed to the advantage of the male by subcutaneous injections with testis tissue. This change of the sex ratio can be increased in this direction if the treatment begins eight days before mating. The greatest influence on the sex ratio was obtained by transplantation of testis into the female rat, performed before the mating. The subcutaneous injections of testis tissue of the same species into the female rat effect a temporary sterility for a period of from three to eleven weeks. Steinach's dogma concerning the antagonism of the gonads is held to be incorrect. A successful transplantation of testis into adult female rats can be obtained without first removing the ovaries. Such females can become pregnant, give birth to young and raise their litters normally. The functioning testis tissue transplanted into the female neither has a significant influence on the biologic function nor changes the morphologic structure of the ovaries.

Cystic Lesions of Appendix.—Outerbridge describes four appendixes showing rather remarkable and unusual lesions, in the form of cystlike cavities of varying sizes, some empty, some containing apparently blood or other débris, some lying immediately in the muscular or serous coats of the appendix or in the mesoappendix, others being surrounded by a small amount of loose cellular tissue. All were in the outer layers, having apparently no relation whatsoever to the mucosa. All were lined by a single layer of columnar epithelium, varying somewhat in height in different instances, and all were associated with definite evidences of marked chronic or subacute inflammatory changes in the appendix. All occurred in women.

Purpura Complicating Pregnancy.—Rushmore's case belongs to the group known as simple purpura, in which there is hemorrhage into the skin only. But, it is peculiar in this respect, that the patient complained of "terrible" itching. There was, at the time she was seen, no evidence of urticaria, or any eruption except petechiae and ecchymoses, neither was there history of any other change in the skin. However, the intense itching suggests strongly that the case belongs with the urticarias or angioneurotic group. It followed an infection (bronchitis) and was accompanied by fever and increased pulse rate. In this connection, the spontaneous termination of pregnancy is especially interesting. It is said to be the only case of pregnancy complicated by this form of purpura noted in the literature.

American Journal of Physiology, Baltimore

74: 225-496 (Oct. 1) 1925

*Studies on Physiology of Sleep. III. Effect of Muscular Activity, Rest and Sleep on Urinary Excretion of Phosphorus. N. Kleitman, Chicago.—p. 225.

*Studies of Physiology of Liver. XII. Muscle Glycogen Following Total Removal of Liver. J. L. Bollman, F. C. Mann and T. B. Magath, Rochester, Minn.—p. 238.

*Inhibition in Ovulation in Fowl by Intraperitoneal Administration of Fresh Anterior Hypophysial Substance. A. T. Walker, Berkeley, Calif.—p. 249.

Effects of Variation in Frequency of Stimulation of Skeletal, Cardiac and Smooth Muscle with Special Reference to Inhibition. H. O. Veach and J. R. Pereira, Boston.—p. 257.

Decerebrate Rigidity and Plastic Tonus After Removal of Lumbar Sympathetics. W. J. Meek and A. S. Crawford, Madison, Wis.—p. 285.

Conditions of Activity in Endocrine Glands. XVII. Nervous Control of Insulin Secretion. S. W. Britton, Boston.—p. 291.

Spectrophotometric Analysis of Commercial Insulin. E. J. Baldes and S. F. Adams, Rochester, Minn.—p. 309.

Some Phenomena of Decerebrate Rigidity. H. C. Coombs and J. Tulgan, New York.—p. 314.

*Effect of Histamin on Cerebrospinal Fluid Pressure. F. C. Lee, Baltimore.—p. 317.

*Differences of Capillary Activity. F. C. Lee, Baltimore.—p. 326.

Muscular Exercise Under Low Barometric Pressure. I. Consumption of Oxygen and Oxygen Debt. E. C. Schneider and R. W. Clarke, Mitchel Field, L. I., N. Y.—p. 334

*Phenolphthalol; Its Preparation and Reaction Toward Oxidases and Peroxidases. G. D. Buckner, Lexington, Ky.—p. 354.
*Egg White vs. Casein as Source of Protein in Diet of Rats. H. S. Mitchell, Battle Creek, Mich.—p. 359.
Hydrogen Ion Concentrations and Basicity of Egg Yolk and Egg White. D. J. Healy and A. M. Peter, Lexington, Ky.—p. 363.
*Is Prolonged Bed Rest a Prerequisite for Measurement of Basal Metabolism? F. G. Benedict, Boston, and E. E. Crofts, South Hadley, Mass.—p. 369.
Superimposed Respirations or Cheyne-Stokes Breathing Caused by Training. P. F. Swindle, Milwaukee.—p. 381.
New Method of Assaying Potency of Female Sex Hormone Based on Its Effect on Spontaneous Contraction of Uterus of White Rat. R. T. Frank, C. D. Bonham and R. G. Gustavson, Denver.—p. 395.
Are Reflexes from Large Veins or Auricle of Importance in Regulation of Circulation? A. C. DeGraff and J. Sands, Cleveland.—p. 400.
Effects of Progressive Anoxemia on Heart and Circulation. J. Sands and A. C. DeGraff, Cleveland.—p. 416.
Factors Influencing Excretion of Urea. II. Diuresis and Caffein. H. Bourquin and N. B. Laughton, Vermilion, S. D.—p. 436.
Autonomic Rhythm of Turtle Heart Strips as Influenced by Regional Gradient and Various Conditions. I. Duration of Initial Inhibition of Cardiac Strips. T. Sollmann and Hung Pih Chu. Cleveland.—p. 451.
Id. II. Maximal Tempo, Average Rate and Index of Inhibition. Hung Pih Chu and T. Sollmann, Cleveland.—p. 464.
Id. III. Time-Decadence of Height of Contractions. T. Sollmann and Hung Pih Chu, Cleveland.—p. 474.
Id. IV. Types of Inhibited Rhythms and Luciani Groups. Hung Pih Chu and T. Sollmann, Cleveland.—p. 478.
Secretin. IX. Its Relation to Activity of Skeletal Muscle. N. B. Eddy and A. W. Downs, Edmonton, Canada.—p. 489.

Effect of Sleep on Phosphorus Excretion.—It is suggested by Kleitman's studies that the increase in the excretion of phosphorus during sleep is due to more complete muscular relaxation in that state.

Physiology of Liver; Blood Glucose; Muscle Glycogen.—Bollman, Mann and Magath are of the opinion that the liver must be regarded as the source of glucose in the blood, and the muscles play little or no part in maintaining the normal level of blood sugar. Following injections of glucose, hypoglycemic dehepatized animals immediately recovered, and if the administration of glucose was continued for some time, muscle glycogen was reformed.

Effect of Hypophysial Substance on Ovulation.—Walker asserts that this inhibition in ovulation is not due to any general systemic toxic effect, since the fowls remained in excellent health and in most cases gained in weight. It appears rather to be due to an injurious effect exerted by the excess of the hypophysial hormone on the developing ova.

Effect of Histamin on Cerebrospinal Fluid Pressure.—Lee found that histamin produced a definite fall in the cerebrospinal fluid pressure in cats and dogs under ether anesthesia. Although the blood capillaries of the viscera have been shown to become markedly dilated in histamin shock, all the evidence indicated that the capillaries of the brain did not react in this way.

Differences of Capillary Activity.—Evidence has been collected by Lee to point out the difference in the behavior of blood capillaries of various organs to the injection of sodium chlorid, histamin, and India ink. The small vessels of the brain did not dilate like the visceral capillaries after histamin was given. Furthermore, they did not indicate the same fluid exchange with crystalloids as the capillaries in organs drained by the lymphatic system. Finally, the passage of particles of India ink from the blood to the lymph vessels of the liver indicated the high degree of permeability in the blood vascular bed of that organ.

Phenolphthalol.—From the experiments made by Buckner, it seems that phenolphthalol is an excellent reagent for the use of detecting oxidases and peroxidases but that, because of the added trouble in making it, phenolphthalein is preferable. Human blood can be detected with certainty in dilution of 1:5,000,000 by the peroxidase test with phenolphthalol.

Protein Value of Egg White and Casein.—The relative values of egg white and casein have been determined by Mitchell, showing that egg white is just slightly less adequate than casein for the growth of young rats. When egg white furnishes 18 per cent. of protein in a standard diet supplemented with yeast, it is an adequate source of protein and especially adapted for use in low mineral diets.

Prolonged Bed Rest Before Basal Metabolism Determination Unnecessary.—The results of observations made by Benedict and Crofts would seem to justify making basal metabolism experiments after a half hour's repose, even if the patient leaves home and goes directly to the laboratory or hospital. The customary sojourn in the hospital over night, prior to such tests, seems therefore to be unnecessary.

American Review of Tuberculosis, Baltimore

12: 87-172 (Oct.) 1925

Vascular Supply of Bronchial Tree. W. S. Miller, Madison, Wis.—p. 87.
Artificial Pneumothorax with Collapse Under Low Intrapleural Pressures. G. F. Aycock, Denver.—p. 95.
Circulatory Changes in Artificial Pneumothorax. R. A. Bendove, Bedford Hills, N. Y.—p. 107.
*Tubercle Bacillus Septicemia in Horse Caused by Bacilli of Avian Origin. E. A. Watson and L. M. Heath, Ottawa, Canada.—p. 116.
*Agglutination of Tubercle Bacilli. J. Freund, Asheville, N. C.—p. 124.
*Complement Fixation in Tuberculosis. III. Nature of Antigen. M. Pinner, Chicago.—p. 142.
*Effect of Mercurochrome in Experimental Tuberculosis of Rabbit. H. J. Corper, S. Mebel and R. Silver, Denver.—p. 156.

Tubercle Bacillus Septicemia.—The term tubercle bacillus septicemia is used by Watson and Heath to denote a form of bacillary infection, so acute, so intense and so diffuse as to cause a fatal termination before any apparent localization of infection or development of miliary tubercles had taken place. No similar case is said to be on record.

Agglutination of Tubercle Bacilli.—The agglutination of tubercle bacilli and its constituents by electrolytes and by immune serum was studied by Freund. His observations support the assumption of a protein surface of the bacilli.

Complement Fixation in Tuberculosis: Nature of Antigen.—Comparative titration of more than seventy preparations derived from tubercle bacilli proved that the main complement fixing substances are closely associated with that fraction of the bacilli which is practically insoluble in acetone, ether and chloroform and soluble in alcohol. It is felt by Pinner that no proof has been given that the alcohol-soluble substances contain the only antigenic principle, but no tubercle bacillus extract from which these substances have been removed retained a sufficient amount of antigenic power to make it fit as an antigen in complement fixation. Evidence is introduced that the degree of dispersion plays an important rôle in the antigenic value of lipoidal tuberculosis antigens. The protein substances exert an inhibiting influence on the lipoids in complement fixation. No evidence has been found for the assumption that certain serums from tuberculous patients react only with protein and others only with lipoidal antigens.

Effect of Mercurochrome in Experimental Tuberculosis Nil.—Corper et al. found that mercurochrome-220 soluble given intravenously daily, over long periods, has no appreciable effect on the tuberculosis developing in rabbits after the intravenous injection of suspensions of virulent human or bovine tubercle bacilli, regardless of whether treatment is begun immediately or a week after infection. The authors conclude that the local tissue toxicity of mercurochrome-220 soluble in relatively low concentrations and its poor tuberculocidal and bacteriostatic efficiency would not seem to justify its use in the local treatment of tuberculous empyemas or pulmonary cavities.

Annals of Clinical Medicine, Baltimore

4: 183-284 (Sept.) 1925

*Rupture of Septum Ventriculorum. C. F. Martin and T. R. Waugh, Montreal.—p. 183.
*Incidence of Bacterial Inflammatory Process in Cardiovascular Defects: Malformed Semilunar Cusps. M. E. Abbott, Montreal.—p. 189.
Parathyroid Hormone: Physiologic Action. J. B. Collip, Alberta, Canada.—p. 219.
*Significance of Multiple Cutaneous Reactions Observed in Hay-Fever Subjects. H. S. Bernton, Washington, D. C.—p. 231.
Ochronosis; with Associated Disease of Suprarenals. W. C. Hunter, Portland, Ore.—p. 250.
Use of Dreyer Method of Vital Capacity Determinations in Examination of Patients. J. M. Swan, Rochester, N. Y.—p. 260.

Rupture of Septum Ventriculorum.—Less than twenty-five cases of this condition are on record. Martin and Waugh report one case, occurring in a man, aged 52, who had previously been in perfect health, and was of good physique

and active in business. Suddenly he suffered an acute and unexpected precordial pain. He compared it to that of gasping after a severe effort. This sensation subsided in a few minutes, and he proceeded to his office duties. During the rest of the day, he was free from symptoms, but in the evening the same gasping sensation returned. He attended a meeting in the evening, and, though feeling unwell, had no return of the sensations. After returning home, the same sensations came on with renewed force. The next day he visited his doctor. A careful examination revealed no signs of cardiac abnormality, although no effort tolerance test was made. He was sent to bed, however, and late that afternoon, for the first time, signs in the heart appeared. The pulse was more rapid; an indeterminate murmur was heard over the precordial area; the temperature was raised, and signs of infiltration in the right apex, with progressively increasing dyspnea, were noted. In the lungs there was evidence of increasing consolidation, and this, with high temperature and rapid respirations, suggested a complicating pneumonia. These conditions persisted without very much change until eleven days after the onset of the illness, when death occurred suddenly. Throughout the illness, except for a sense of oppression and indefinite precordial pain, there was no suggestion of anginal attack until the agonal distress at the end, when severe pain was complained of immediately before death. While the diagnosis suggested some possible rupture of the septum, it was felt that the most important feature was the progressively developing pneumonia, and yet, as the pathologic record shows, no genuine pneumonia existed, but merely a passive congestion of the lung with splenization. The necropsy revealed a rupture of the interventricular septum at the apex of the heart. It is evident that a gradual thrombosis had occurred in the left coronary artery and had been the initial cause of the rupture. From the character of the lesion, it was apparently syphilitic in origin, although no history of syphilis was admitted and no Wassermann reaction was obtained. Obviously, from the pathologic findings, there was at first a very small foramen which gave rise to the first symptoms and the physical signs, while the larger rupture must have occurred immediately before death. Characteristic of this condition from the clinical standpoint is the sudden development of a loud extensive murmur, referable in no way to any one valve or even a multiple valvular lesions; its maximum intensity over the immediate precordial area is likewise a point worthy of notice.

Incidence of Infective Endocarditis in Cardiac Anomalies.—The literature on this subject is reviewed by Abbott, and the incidence of infective endocarditis in 555 cardiac anomalies "of clinical significance" is noted. The highest frequency is in malformed cusps and ventricular septal defects, followed by pulmonary stenosis and then patent ductus. It did not occur in the defects in the upper parts of the interauricular septum, probably because of the lack of proximity to the valvular endocardium. Nor was it noted in the extreme cases of congenital cyanosis. Such patients usually die at an early stage. On the basis of the study of the literature, the conclusions are drawn that infective endocarditis is extremely common in patients with cardiac defects who live to maturity; the process is most commonly subacute bacterial and this is especially true of anomalies in the left heart; in septal defects and patent ductus, an acute bacterial infection is relatively more frequent and here the lesion is usually right sided and gives unmistakable evidence, both by this fact and by the presence of infarcts in the pulmonary circulation and absence of these on the systemic side, that the shunt in these abnormal communications is arterial-venous under the ordinary conditions of the circulation in health. Six cases are reviewed, four of which have not been reported previously.

Multiple Cutaneous Reactions in Hay-Fever.—Cutaneous tests with various pollens have been made by Benton in a series of fifty-seven cases of autumnal hay-fever. Of a total of eighty-two tests performed with pollens of the compositae group, seventy-one, or 86.5 per cent., have proved positive. Of a total of 393 tests performed with other wind borne pollens, seventy-eight, or 19.8 per cent., have proved positive. These positive reactions have been obtained with pollens of twenty-one genera of plants belonging to ten families. These results are illustrative of "secondary or accessory reactions." The practice of desensitizing patients with as many pollen extracts as yield positive cutaneous reactions is said to be as unnecessary as it is unwarranted.

Archives of Otolaryngology, Chicago

2: 217-320 (Sept.) 1925

Surgical Treatment of Facial Paralysis. A. W. Adson, Rochester, Minn. —p. 217.
Pathogenesis of Polyposis Nasi. A. O. Freedman, Montreal.—p. 250.
Bone Conduction After Method of Runge. J. W. Downey, Baltimore. —p. 260.
*Nasal (Sphenopalatine) Ganglion in Relation to Itching in Auditory Canal and to Tinnitus Aurium. S. L. Ruskin, New York.—p. 269.
Bibliography on Acute and Chronic Suppurative Otitis Media, Including Acute Infection of Blood Stream. S. J. Kopetzky, New York.—p. 271.

Nasal Ganglion and Itching in Auditory Canal.—Ruskin has now treated five cases of persistent itching in the external auditory canal in which relief was given by treating the nasal ganglion with local application of a saturated solution of cocain. It is emphasized that the symptom of itching ears can appear without any other indication of nasal ganglion disturbance. In one case of itching sensation in the eyes, often interpreted as a sandy feeling associated with a heaviness of the eyelid, relief was obtained by the same treatment. In some of these cases there have been no recurrences of the itching; in a few there have been recurrences, but they have been extremely mild.

Boston Medical and Surgical Journal

193: 857-898 (Nov. 5) 1925

Diagnosis and Treatment of Biliary Tract Disease. F. H. Lahey, Boston. —p. 857.
Wassermann Test. XIX. Sulpharsphenamin Dermatitis; Case. D. L. Belding and J. Goldman, Boston.—p. 863.
Success in Medicine. H. M. Pollock, Boston.—p. 867.
Treatment of Early Paronychia. W. P. Coues, Brookline.—p. 871.
Paranoia. Traumatic Industrial Accident Case Complicated by Mental Derangement. H. J. Cronin, Cambridge.—p. 872.

Journal of Clinical Investigation, Baltimore

2: 1-116 (Oct. 20) 1925

*Value of Sodium Benzoate Test of Renal Function; Effect of Injury of Liver on Hippuric Acid Synthesis. A. W. Bryan, Rochester, Minn. —p. 1.
*Morning Alkaline Tide of Urine in Normal Persons and in Patients with Nephritis. J. E. McCorvie, Rochester, Minn.—p. 35.
*Orthopnea and Effect of Posture on Rate of Blood Flow. H. Field, Jr., and A. V. Bock, Boston.—p. 67.
Elimination of Carbon Monoxid from Blood. W. C. Stadie and K. A. Martin, New Haven, Conn.—p. 77.
Effect of Anoxemia on Heart. I. Auriculoventricular Conduction. W. H. Resnik, Baltimore.—p. 93.

Value of Sodium Benzoate Test of Renal Function.—Bryan holds that the sodium benzoate test is of value in determining the functional capacity of the kidneys. No other type of affection so definitely and markedly affects its synthesis or elimination. However, a free benzoic acid value above 3 per cent. of the administered dose of sodium benzoate suggests a secondary hepatic lesion, the high value probably being due to the inability of the liver to mobilize glycocoll; it probably should not be construed as reflecting against the ability of the kidney to detoxicate the substance. In other cases the amount of free benzoic acid is probably negligible, clinically speaking. The benzoate test is probably a more delicate indicator of early functional renal disturbance than other tests in common use, and therefore, should be of greatest value in patients with early suspected renal involvement, or in patients whose phenolsulphonephthalein or blood urea tests are still normal or have returned to normal. The test has no particular advantage over other tests in advanced cases, as the technic is more time consuming, although this factor, in a well organized laboratory in an institution where many renal cases are studied is by no means prohibitive.

Morning Alkaline Tide of Urine.—McCorvie reports the results of his investigation of the night specimens and hourly morning specimens of urine in a series of normal and abnormal subjects. Most of the abnormal cases were of renal lesions. Normal subjects, as demonstrated by Leathes and confirmed by the author's experiments, always show a diuresis and an increase in alkalinity during the morning, while abnormal subjects may react like the normal, or show limi-

tation, either partial or complete, of either or both. In addition, among the abnormal subjects examined, there were a few with a high initial alkalinity and an acid tide during the morning. The specific gravity may show little variation even with a diuresis within normal limits, an alkaline tide or both. Cases with no alkaline tide are usually severe clinically. An acid tide is of grave prognostic import. The curve of the p_H figures parallels that of the alkalinity percentage. In the cases reported here, both normal and abnormal, a higher p_H figure was always accompanied by increased relative carbon dioxide and a more acid urine by a decrease in carbon dioxid. The phosphates of normal subjects, as demonstrated by Fiske, have an initial drop followed by a late rise during the morning. In the present series the night specimen was found to have a much lower phosphate content in abnormal than in normal subjects. The results of these investigations show that this test may be of clinical value from the point of view of diagnosis and prognosis.

Effect of Posture on Blood Flow.—Data showing a diminution in the rate of blood flow in the upright position, thought to be due to an effect of gravity, impeding the return of venous blood to the heart, are presented by Field and Bock. The manner in which the diminished blood flow in the upright position may reduce dyspnea by relieving the congestion in the pulmonary circulation is discussed.

Journal of Comparative Psychology, Baltimore

5: 345-416 (Oct.) 1925

Static Equilibrium of Airplane Pilots. G. Brammer, Stanford University, Calif.—p. 345.
Value of Preliminary Period of Feeding in Problem Box. C. J. Warden, New York.—p. 365.
Reproduction of Guinea-Pigs. G. T. Avery, Stanford University, Calif.—p. 373.
Learning by White Rats of Inclined Plane Maze. J. F. Dashiell and H. A. Helms, Chapel Hills, N. C.—p. 397.
Relative Strength of Sex: Hunger Motives in Albino Rat. C. Tsai, Shanghai, China.—p. 407.

Journal of Urology, Baltimore

14: 313-428 (Oct.) 1925

Indications for Vasotomy. E. G. Mark, Kansas City, Mo.—p. 323.
*Vasopuncture; Modification of Vasotomy for Seminal Vesiculitis. B. A. Thomas, Philadelphia.—p. 331.
Injuries Possible Through Vasotomy. W. T. Belfield, Chicago.—p. 349.
*Infections Along Sheath of Vas Deferens. H. C. Rolnick, Chicago.—p. 371.
Case of Prostatic Tuberculosis without Discoverable Lesions in Kidneys or Epididymides. E. L. Keyes, New York.—p. 385.
*End-Result of Hypernephroma. G. G. Smith and A. B. Shoemaker, Boston.—p. 389.
*Incidence of Ureteral Stricture. N. P. Rathbun, Brooklyn, N. Y.—p. 403.
Controlled Diathermy Treatment of Bladder Tumors. J. H. Cunningham, R. C. Graves and W. T. Bovie, Boston.—p. 411.
*Case of Exstrophic Bladder with Neoplastic Implant. J. F. McCarthy and P. Klemperer, New York.—p. 419.

Vasopuncture for Seminal Vesiculitis.—In 1913 Thomas first suggested and performed vasopuncture for medication in seminal vesiculitis, in preference to vasotomy or vasostomy. He injects from 3 to 5 c.c. of 5 per cent. collargol or other colloidal silver preparation, or perhaps 0.25 per cent. chloramin-T. The whole technic is described in detail.

Infections Along Sheath of Vas Deferens.—Rolnick is convinced that the sheath of the vas deferens acts as a means of transmission of infection from the seminal vesicle. This infection can manifest itself as a funiculitis or actually a perivasitis. It can extend to the tunica vaginalis and produce a periorchitis. Bacteria carried along the sheath may infiltrate into the tunica vaginalis propria and produce an orchitis. Idiopathic hydrocele with marked thickening of the parietal tunica vaginalis may develop secondary to a subacute or chronic infection of the seminal vesicles, which is carried along the sheath of the vas deferens.

End-Results of Hypernephroma.—The records of sixty-two cases of hypernephroma were studied by Smith and Shoemaker. Of twenty-seven cases in which the tumor was removed, the operation could be called worth while in nine cases. Six more patients were discharged relieved, but were lost track of. The duration of life in cases not subjected to nephrectomy and the pathologic anatomy of the disease are discussed.

Incidence of Ureteral Stricture.—Rathbun contends that ureteral stricture is far more common than is believed to be the case. He reviews sixty-three cases in which a diagnosis of primary ureter stricture was made. In thirty-four of these the urine was free from pus and sterile. Varying degrees of infection were noted in the remaining thirty-nine cases. In all cases there was dilatation of the uterer above the stricture and in most of them there were evidences of dilatation of the renal pelvis, varying from a slight degree to a well marked hydronephrosis. Practically all of the latter group showed varying degrees of infection, a few having gone over to pyonephrosis with a more or less complete destruction of the kidney. Eleven cases were a part of the pyelitis of pregnancy and the puerperium. Practically without exception this entire group of sixty-three patients were relieved or improved by a line of treatment based on the diagnosis of ureteral stricture.

Vasectomy for Exstrophic Bladder.—McCarthy's patient, aged 47, had a number of operations performed in Europe for exstrophic bladder with indifferent results. McCarthy removed one kidney, the ureter of the remaining kidney was ureterostomized abdominally, and the bladder was completely extirpated. The patient is now perfectly comfortable and has improved physically to a very great degree.

Medical Journal and Record, New York

122: 505-572 (Nov. 4) 1925

Recognition and Treatment of Neurocirculatory Asthenia in Civil Life. G. M. Piersol, Philadelphia.—p. 505.
Prognosis in Cancer. L. Herly, New York.—p. 509.
Dysentery, Malaria, Intestinal Worms and Other Tropical Diseases. G. B. Lake, Chicago.—p. 513.
Clinical Aspects of Steinach Operation. H. Benjamin, New York.—p. 515.
Can Life be Saved by Transplanting an Organ? C. Deedera, New York.—p. 519.
Skeletal Traction in Fractures. C. S. James, Los Angeles.—p. 520.
Observations on Eastern Clinics. J. A. Mattison, Sawtelle, Calif.—p. 522.
Narcosis by Ethylidene Chlorid; Methylene Chlorid and Their Mixtures. D. M. Rossiysky, Moscow, Russia.—p. 524.
Submucosa Dissector. A. J. Graham, Chicago.—p. 527.
New Reloading Needle for Implantation of Radium Emanation in Capillary Glass Tubes. P. E. Durham, New York.—p. 527.
Automatic Transfusion Apparatus Made from Ordinary Ear Douche. S. G. Berkow, Perth Amboy, N. J.—p. 529.
Infections, Infectious Diseases, and Immunization. W. H. Park, New York.—p. 531.
Diabetes Mellitus; Preventive Measures and Early Diagnosis. H. O. Mosenthal, New York.—p. 534.
Asthma and Preasthmatic Conditions. R. A. Cooke, New York.—p. 537.
Presurgical Conditions, Including Cancer. E. H. Pool, New York.—p. 540.
Periodic Health Examinations from Viewpoint of Endocrinology. W. Timme, New York.—p. 543.
Skin and Syphilis. H. Fox, New York.—p. 545.
Teeth in Olden Times. W. R. Riddell, Toronto, Can.—p. 547.

Military Surgeon, Washington, D. C.

57: 449-560 (Nov.) 1925

Means and Policies Which Will Best Enable This Association to Increase Its Membership and Accomplish Its Patriotic Objects as Stated in Its Constitution. A. C. Carlton.—p. 477.
Work of Industrial Preparedness Section, Supply Division, Surgeon General's Office, War Department. N. L. McDiarmid.—p. 495.
Parasitology as Aid to Medical Officer. W. B. Herms.—p. 517.
Humanity of Chemical Welfare. H. L. Gilchrist.—p. 529.
Critique of Medical Department Bulletin. D. M. Davis.—p. 539.

Philippine Islands Medical Association Journal, Manila

5: 251-288 (Sept.) 1925

*Hydrocephalus Artifically Produced. J. C. Nanagas.—p. 251.
Dangers of Nonoperative Treatment in Hypertrophy of Prostate. J. Eduque.—p. 263.
Anterior Thoracotomy for Chondrosarcoma of Rib; Case. C. Reyes.—p. 268.
*Neo-Arsphenamin in Treatment of Amebic Dysentery. P. T. Lantin.—p. 269.

Artificially Produced Hydrocephalus.—The symptoms and anatomic picture observed by Nanagas in artificially produced hydrocephalus in kittens are very similar to those encountered

in congenital hydrocephalus in man. He says that production of hydrocephalus can be by either one of two ways; namely, by a mechanical or pathologic blocking of the aqueduct of Sylvius, damming the outflow of cerebrospinal fluid from the cerebral ventricles, or by a nervous influence of some kind accelerating the secretion of cerebrospinal fluid from the chorioid plexus, and may or may not be accompanied by the impairment of absorption of fluid through the arachnoid mater of the cerebral meninges into the dural sinuses. The subarachnoid method of production of hydrocephalus offers an opening for further investigation toward the determination of the nervous process or mechanism that leads to the impairment of the proper rate of absorption of the cerebrospinal fluid through the arachnoid and, thus, to the production of hydrocephalus. This nervous connection would seem most probably to be one of the etiologic factors in the production, congenitally, of hydrocephalus in man.

Neo-Arsphenamin in Amebic Dysentery.—In eleven cases of chronic amebic dysentery, Lantin administered neo-arsphenamin intravenously, in varying dosage of from 0.30 to 0.60 gm. In all these cases, with the exception of one, the results obtained were very encouraging. The injections were followed by marked improvement of the symptoms. The cysts and the trophozoites disappeared from the feces in a short time. Administration by rectum (enema) gave good results in one case. The parasites were not seen fourteen hours after the administration of the solution by rectum (enema) and were not found in the successive feces examinations. In some way this by rectum (enema) method is preferable to the intravenous, because (1) it avoids the dangers and fatal accidents consequent on the intravenous route; (2) it is a very simple method that any person can administer to the patient without difficulty; (3) it may be one of the best ways of introducing the drug into the human body if the solution is properly retained.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Dermatology and Syphilis, London

37: 401-448 (Oct.) 1925

Lupus Erythematosus. W. Dyson.—p. 401.
*Etiology of Lupus Erythematosus. A. M. H. Gray.—p. 406.
*Two Cases of Raynaud's Syndrome Presenting Unusual Features. P. B. Mumford.—p. 414.

Etiology of Lupus Erythematosus.—Gray insists that lupus erythematosus must be regarded as a definite clinical entity. It is a specific infective disease. The lesions are due to the local activity of a specific micro-organism. There is not sufficient evidence that this organism is the tubercle bacillus. Tuberculosis is a common accompaniment of the disease; the disease either predisposes to tuberculous infection or lights up preexisting tuberculous infection, or tuberculous subjects are specially liable to contract lupus erythematosus. Streptococcal infection is a fairly frequent terminal manifestation, especially of the acute types of the disease, and streptococcal infection may also complicate the less severe types.

Raynaud's Disease.—In one of Mumford's patients there were gangrenous patches on the hands, ears and feet and a catheter specimen of urine was found to contain a few pus cells, blood corpuscles and a streptococcus, which proved on culture to belong to the long chain group. The patient died after a series of fits of clonic type, commencing on the right side of the body and spreading to the left side later. Each fit (of which there were about a dozen) lasted two minutes, the patient being unconscious in the intervals. A postmortem examination was refused.

British Medical Journal, London

2: 679-726 (Oct. 17) 1925

Osteopathy, Chiropractic and Medicine. H. J. Waring.—p. 679.
Some Intestinal Disorders of Infancy. H. T. Ashby.—p. 683.
*Partial Intestinal Obstruction in Child Due to Postrectal Teratoma. A. E. Sawday.—p. 685.
Overlooked Cases of Foreign Body in Air and Food Passages. I. C. Jackson.—p. 686.
Id. II. T. McCrae.—p. 693.
*Id. III. M. Woodman.—p. 698.
Bronchoscopy for Disease. C. Jackson.—p. 699.
Acute Appendicitis in Octogenarian. W. T. Thomas.—p. 700.
Rectal Injection of Tartar Emetic for Bilharziasis. J. B. Anderson.—p. 700.
Torsion of Large Dermoid Ovarian Tumors. J. S. Robinson and J. H. Grove-White.—p. 700.

Intestinal Obstruction Due to Postrectal Teratoma.—In the case cited by Sawday the pelvis was completely filled by a hard retroperitoneal mass. Some fragments of the tumor were secured for microscopic examination. The section consisted of a mass of tissue which was made up of small papillary outgrowths of fibrous stroma, covered with epithelium of an elementary type, and contained numerous tiny hard nodules (cartilage). No hairs or teeth were found. However, there was no doubt that the tumor was a teratoma. The child, aged 4 years, died from uremia about three weeks after the operation.

Knife in Pleural Sac After Swallowing.—A woman admitted having swallowed a large poultry knife fourteen days previously. This was shown to be present on roentgen-ray examination and appeared to be in the midthoracic region of the esophagus. Under local anesthesia, a Jackson tube was inserted rapidly down the esophagus, which appeared to be empty. On retracting the route, a small slitlike opening was found in the posterior wall of the pharynx immediately above the entrance to the esophagus. The tube was then passed downward into the mediastinum and soon wandered in a maze of vessels in which localization was difficult or impossible, but no knife was found. An external incision had to be made, and a gush of air indicated that the pleural sac was open. Fingers were inserted through the slit, and the handle of the knife felt and removed. The patient subsequently died. The knife had entered the pleural sac near the apex, grazed the side of the lung, and its point had entered the diaphragm. The striking point in this case was that in a moment of insanity the patient had attempted suicide, and, failing, had made no mention of the fact to her friends, and she had actually walked about for fourteen days with the knife in situ.

Calcutta Medical Journal

20: 49-96 (Aug.) 1925

Filariasis. N. Banerji.—p. 49.
Superficial Pustular Folliculitis. G. Panja.—p. 64.
Tuberculous Cervical Glands. D. C. Chakraverti.—p. 68.
Case of Properitoneal Hernia. P. Chatterji.—p. 73.
Nodular Leprosy Resembling Frambesia; Case. M. Nath Dr.—p. 75.

Heart, London

7: 171-300 (Oct. 15) 1925

*Dynamics of Ventricular Systole. III. Aortic Stenosis; Aortic Insufficiency. L. N. Katz and H. S. Feil.—p. 171.
Schema of Circulation with Experiments to Determine Additional Load on Apparatus Produced by Conditions Representing Valvular Lesions. G. A. Allan.—p. 181.
Apparatus for Delivering Rhythmic Break Shocks; Also Interpolated Break Shocks Which Automatically Advance. A. N. Drury.—p. 205.
Conduction in Mammalian Heart. A. V. Condition. T. Lewis and A. M. Master.—p. 209.

Dynamics of Ventricular Systole.—The duration of the systolic phases of nine cases of aortic stenosis and thirteen cases of aortic insufficiency, which were determined from records obtained by optical methods of registration, were compared with normal values at corresponding heart rates, and the following conclusions are formed by Katz and Feil: In aortic stenosis the isometric contraction period is slightly lengthened. The ejection phase and total systole are definitely prolonged. The prolongation of ejection may be considered as a mechanism tending to compensate for the reduced rate of ejection. In aortic insufficiency the isometric contraction period is distinctly abbreviated, the result, they believe, of an increased contraction rate of the ventricle and of a reduced diastolic pressure in the aorta. The ejection phase is lengthened, and total systole is approximately normal in duration. The prolongation of ejection permits the heart to eject a greater quantity of blood.

Irish Journal of Medical Science, Dublin

401-446 (Sept.) 1925

Artificial Sunlight Treatment. B. Crichton.—p. 407.
Volvulus of Stomach. F. Gill.—p. 418.

Japan Medical World, Tokyo

5: 237-274 (Sept. 15) 1925

Epidemic of Encephalitis in Japan in 1924. R. Kaneko.—p. 237.
*Histologic Studies of Normal and Pathologic Human Parathyroid Glands. K. Kurokawa.—p. 241.

Function of Oxyphil Cells in Parathyroid Glands.—Kurokawa asserts that the oxyphil cells in the parathyroid glands are not merely a degenerative form but that they have important function. The oxyphil cells are larger than the chief cells and rich in stainable substances. The protoplasm and nuclei do not show any degenerative changes. Occasionally, fatty substances may be found in the cells, but they are not a sign of hypoplasia of the cells. The appearance or increase of the oxyphil cells does not accompany the increase of intercellular tissue, which may be regarded as an atrophic change. The oxyphil cells increase with age, but the increase is not a senile change. The oxyphil cells appear in masses and often form nodules, some of which may be seen with the naked eye. This is called nodular hyperplasia of oxyphil cells. The parathyroid gland has no physiologic atrophy; consequently, it is wrong to lay stress on its function only during the growing period. The oxyphil cells appear at the time when the clear chief cells begin to decrease, with increase of the dark chief cells, and they also increase during pregnancy. These facts indicate that they have an important function.

Journal of Biochemistry, Tokyo

5: 113-292 (July) 1925

Glucolytic Power of Blood. V. Adsorption Experiments with Sugar by Means of Animal Charcoal and Erythrocytes. Y. Kawashima.—p. 113.
Combining Forms and Quantitative Estimation of Argina in Protein Molecole. S. Sakaguchi.—p. 133.
Deargino-Protein. S. Sakaguchi.—p. 143.
Synthesis and Destruction of Phosphatids in Animal Bodies. K. Koizumi.—p. 171.
Content of Fatty-Like Substances in Cocks Fed Vitamin B Free Diet. E. Kodama.—p. 185.
New Methods for Determination of Cystein. Y. Okuda.—p. 201.
New Methods for Determination of Cystin in Proteins (Iodin Method). Y. Okuda.—p. 217.
Comparative Biochemistry. I. Occurrence of Arginase in Various Animal Organisms. Y. Sendju.—p. 229.
*Renal Function During Pregnancy. K. Yamada.
Partial Bromidization of Phlorhizin. III. K. Misaki.—p. 287.

Renal Function During Pregnancy.—Yamada points out that the secretory abnormalities of the kidney in a pregnant animal seem to be a partial phenomenon of tissue intoxication at large, caused by an increase of ammonia due to the production of abnormal acids, and that they are not a direct lesion of the kidney itself.

Journal of Tropical Medicine and Hygiene, London

28: 361-376 (Oct. 15) 1925

Identity of Gongylonema Subtile Alessandrini. H. A. Baylis.—p. 361.
Identity of Heterakis Neoplastica, Wassink. H. A. Baylis.—p. 362.
Radulae of Fresh Water Mollusca. F. G. Cawston.—p. 365.

Lancet, London

2: 847-898 (Oct. 24) 1925

Developments of Harvey's Doctrine, "Omne Vivum Ex Ovo." F. Mott.—p. 847.
Third Circulation and Its Channels. I. H. Cushing.—p. 851.
Anatomically Irregular Sphenoidal Sinusitis with Optic Neuritis Localized by Suction Syringe. P. Watson-Williams.—p. 858.
*Relation of Nephritis in Egypt to Intestinal Infection. H. B. Day.—p. 860.
*Respiratory Catarrh in Children. R. C. Clarke.—p. 864.

Relation of Nephritis to Intestinal Infection.—Investigations made by Day show that the onset of acute or subacute nephritis in Egypt is commonly preceded by intestinal infection. Bacteriologic examination of the urine in such cases shows the presence of bacilli of intestinal types. These bacilli are capable of reproducing nephritis in laboratory animals. Cure of an intestinal lesion was found to benefit a consecutive nephritis. Vaccine treatment was frequently successful in these cases of infective nephritis. The dose should be inversely proportional to the severity of the renal symptoms. The oral administration of vaccine was found efficacious. Intestinal antiseptics proved of very limited value. For patients with obvious intestinal lesions a direct therapy was indicated. Some forms of chronic dysentery of amebic or bilharzic origin responded to emetin injections and showed a distinct improvement in the renal condition as soon as the intestinal infection was controlled. Similarly, patients with nephritis complicating ankylostomiasis benefited by specific treatment. For acute cases of nephritis and pyelitis when bacilli were plentiful in the urine, the free administration of alkalis appeared beneficial, as in bacilluria. Urinary antiseptics were of little avail, and the impaired excretory power of the kidneys prevented the usual degree of concentration in the urine.

Respiratory Catarrh in Children.—Making routine examinations of infants from 3 to 6 weeks old, Clarke noted that at least half of them had respiratory catarrh. He thinks that the development of respiratory catarrh probably depends on two main factors: (1) the number and virulence of the catarrhal organisms which attack the mucous membrane; (2) the local resistance of the mucous membrane and the general immunity of the body. It has been shown that the mucous membrane secretes a definite bacteriolytic agent. What would appear from clinical observations is: (1) that the very young mucous membrane is deficient in resistance; (2) that the mucous membrane, which has been the object of early and repeated attacks, either loses or never acquires an adequate resistance. The mother and germ laden atmosphere are the sources of infection. To prevent infection, if the mother has acute catarrh when the baby is born, she should be instructed to wear a folded handkerchief over the mouth and nose while "doing" or feeding the baby. This precaution should be extended to the maternity nurse and children's nurse. All persons coming to view the infant should be inspected for colds and shut out if a cold is admitted and should always be requested neither to breathe on nor kiss the baby. To avoid the other main method of infection, the germ laden atmosphere, is an easy matter in an uncrowded house. The infant should either be kept out of doors or in a draft. It is difficult to overcome prejudice in this matter, especially during the daily bath, but it is certain that no infant can come to any harm if efficiently bathed in front of a fire with all the windows open. For the rest, children should be kept away from people with colds and children's parties should be cut down to a minimum. Clarke lays great emphasis on this last point.

Medical Journal of Australia, Sydney

2: 417-442 (Oct. 3) 1925

Practice of Medicine in Middle Ages. W. E. Blackall.—p. 417.
Plexiform Neuroma: Case. G. Bell and K. Inglis.—p. 423.
Congenital Tumor (Plexiform Neuroma) of Left Upper Limb. G. Bell and K. Inglis.—p. 427.
Chronic Tuberculous Osteomyelitis of Femur in an Adult. B. T. Edye.—p. 428.

Medical Journal of South Africa, Johannesburg

21: 31-58 (Sept.) 1925

Vulvovaginitis in Children. A. R. Fraser.—p. 31.
Renal Sarcoma in Infant. C. F. Beyers.—p. 38.
Results of One Hundred and Fifty-Three Consecutive Cases of Suprapubic Prostatectomy. H. T. Mursell.—p. 40.
Bilharziasis of Female Genital Tract. R. W. B. Gibson.—p. 44.
Bench, Bar and Medicine. J. C. Dove-Wilson.—p. 45.

Practitioner, London

115: 223-300 (Oct.) 1925

Early Diagnosis of Disease of Spinal Cord. F. Mott.—p. 233.
Etiologic Aspect of Nervous and Mental Disorder. J. G. P. Phillips.—p. 248.
Results of Operative Treatment of Malignant Disease of Breast. H. P. W. White.—p. 255.
Rural Midwifery Practice. E. K. Mackenzie.—p. 264.
Action of Waters and Baths in Arthritis. V. Contes.—p. 274.
Blood Pressure in Diseases of Skin. W. K. Sibley.—p. 282.
Ionization Treating Chronic Inflammation of Nasal Sinuses Without Operation. A. G. Dampier-Bennett.—p. 285.

Annales des Maladies Vénériennes, Paris

20: 721-800 (Oct.) 1925

Visceral Syphilis. J. Golay and A. Starobinsky.—p. 721.
*Congenital Dislocation of the Hip Joint. S. Cassavetis.—p. 739.
*Case of Lupiform Syphilid. E. Pisani.—p. 756.
Sudden and Tardy Rousing of Latent Chronic Gonorrhea. Belgodère.—p. 761.
Urethritis Caused by Pasteurella. Synghellakis.—p. 772.

Pathogenesis of Congenital Dislocation of the Hip Joint.—Cassavetis analyzes the five theories of congenital dislocation of the hip joint, namely, trauma; vicious position and compression of the fetus; inflammatory process; muscle imbalance, and malformation. He believes that congenital syphilis may cause the arrest of development of the hipbone and consecutive dislocation. He describes in detail five out of a total of twenty cases in which congenital syphilis seemed to be the predominant factor. Hence specific treatment for syphilis and endocrine organotherapy may sometimes advantageously supplement surgical intervention in these congenital luxations.

Syphilitic Eruption Resembling Lupus.—Pisani observed this case in an adolescent. The aspect of the scars, the seven years' duration of the process, and the easy bleeding of the ulcerations, simulated lupus. But a positive Wassermann test in the patient and his mother suggested rather a lupiform rupioid syphilid in a subject with tardy congenital syphilis. This diagnosis was confirmed by specific therapy, as the eruption became favorably modified, tending to cicatrization, under the first injections of bismuth.

Archives de Médecine des Enfants, Paris

28: 601-664 (Oct.) 1925

Amebic Dysentery in Very Young Children. M. Petzetakis.—p. 601.
Helminthiasis in Warsaw Children. Cieszynski and Gileczek-Hac.—p. 623.
*Prenatal Treatment of Syphilis. J. Dayras.—p. 631.
*Meningeal Hemorrhage in the New-Born. J. Comby.—p. 638.

Prophylaxis of Congenital Syphilis.—Dayras reiterates that to prevent syphilis in the offspring, intensive specific treatment is important not before, but immediately after impregnation, if the husband has had syphilis and the wife has shown no signs of syphilis before. Since the transmission of syphilis to the child is not hereditary but congenital, the treatment should be instituted in such cases immediately with any delay in the menses. After conception, the treatment must be continued to the very last day of the pregnancy.

Lumbar Puncture in Cerebral Hemorrhage of the New-Born.—Comby believes that a lumbar puncture, soon after birth, is indicated in every new-born infant who has been exposed to injury to the cranial bones, or to any congenital infection or toxic action inducing fragility of the vessels. In cases with uncertain symptoms, the puncture may not only confirm the fact of a meningeal hemorrhage, but also contribute to the recovery. He cites thirteen cases of this kind, with recovery in 50 per cent. under repeated lumbar puncture, followed by intraspinal injection of horse serum and subcutaneous injection of some bland hemostatic solution.

Bruxelles Médical, Brussels

5: 1470-1496 (Oct. 11) 1925

Polyvalent Serum Against Gangrene. H. Vincent.—p. 1470.
The Medical Expert. L. Delattre.—p. 1479.
*Crystals in Cerebrospinal Fluid. Bech.—p. 1484.

Crystals in the Cerebrospinal Fluid During Meningitis.—Repeated examination of the cerebrospinal fluid from a girl, aged 4, with meningitis, revealed the presence of numerous flat crystals, responding to tests for cholesterol. So far as Bech's knowledge extends, this is the first case to be published in which such crystals were present in the cerebrospinal fluid.

Bulletin de l'Académie de Médecine, Paris

94: 901-916 (Oct. 20) 1925

*Oxygen for Subcutaneous Injection. Agasse-Lafont and Douris.—p. 904.
Smallpox in a Southern Province of France. L. Camus.—p. 906.
Functional Restoration After Total Colectomy. Duval.—p. 910.
The Tubes in Disease of Uterus and Adnexa. C. Daniel.—p. 912.

Improvised Supply of Oxygen for Subcutaneous Injection.—With Agasse-Lafont and Douris' technic every practitioner will be able to generate oxygen enough for an injection. The oxygen is collected in a 50 c.c. jar as released by the action of potassium bichromate on hydrogen dioxid. The supply is ample for the purpose,

Bulletin Médical, Paris

39: 1109-1128 (Oct. 17) 1925

Incidents and Accidents of Vaccination Against Smallpox. P. Blum and L. Bouttier.—p. 1115.
*Zinc Chlorid in Treatment of Metrorrhagia. L. M. Pierra.—p. 1117.

Zinc Chlorid Solution in Hemorrhagic Metritis.—Pierra obtained favorable results with the Delbet method in twenty cases of hemorrhagic metritis. He used 1 c.c. of a 10 or 20 per cent. solution of zinc chlorid, for intra-uterine instillation, introducing the tip of the syringe to the fundus of the uterus. The first three injections were made at eight or ten days' intervals; the next at five or six days'. A total of six or eight instillations were given. Only in two patients the instillations were interrupted on account of severe pain from the solution. The treatment appeared to be effectual in all varieties of hemorrhagic metritis, except those from incomplete abortion, or associated with lesions of the adnexa.

Bulletins de la Société Médicale des Hôpitaux, Paris

49: 1327-1338 (Oct. 23) 1925

*Hemophilia Versus Hemogenia. J. Comby.—p. 1327.
*Calcification of Pineal Gland. A. Léri and F. Layani.—p. 1329.
The Benzyl Ester of Cinnamic Acid in Treatment of Tuberculous Glands. J. Jacobson.—p. 1329.

Two New Cases of Hemogenia.—Comby adds two cases of hemogenia to that recently reported by Emil-Weil and Isch-Wall. An infant developed extensive ecchymoses and a hematoma as she bumped herself in learning to walk. An excessive tendency to ecchymoses was manifest also in the mother. Both mother and child seemed healthy otherwise. In another woman, aged about 50, extensive ecchymoses appeared after the slightest injury to the skin. This was associated with abnormally profuse menses and hemoptysis recurring for twenty years. The lungs proved to be normal. These cases which, Comby says, were previously considered as an attenuated form of hemophilia, may belong in the hemogenia group.

Roentgenogram in Diagnosis of Pineal Tumor.—Léri and Layani refer to Alajouanine, Lagrange and Baruk's case in which the diagnosis of a tumor of the pineal gland was based on a roentgenogram showing a dark spot in the corresponding area. They state now that a similar shadow was found in the roentgenograms from twenty-seven of 103 subjects without any sign of a pineal lesion.

Comptes Rendus de la Société de Biologie, Paris

93: 889-976 (Oct. 23) 1925. Partial Index

*Cholesteremia of Pregnant Tuberculous Women. M. Salomon and De Potter.—p. 891.
*Cholesteremia and Arterial Pressure in the Tuberculous. M. Salomon and De Potter.—p. 894.
Advantages of Dark Field for Microscopic Study of Preparations After Fixation and Staining. Jeantet.—p. 895.
Pulverized Tapioca in Culture Mediums. Berthelot and Ramon.—p. 896.
*Immunization Against Tetanus. G. Ramon and P. Descombey.—p. 898.
*The Blood in Typhus. N. Kossovitch.—p. 900.
Tuberculosis and Vitamin C Deficiency. G. Mouriquand et al.—p. 901.
*Restoration of Sight After Resection of Optic Nerve. Matthey.—p. 904.
The p_H of Sea Water. G. Bohn and A. Drzewina.—p. 917.
Rôle of Skin in Hog Cholera in Guinea-Pigs. A. de Jeney.—p. 921.
Method for Recording Heart Sounds and Pulsations. Barry.—p. 923.
*The Coagulability of the Blood. H. Roger and L. Binet.—p. 925.
*Case of Induced Pott's Disease. P. Chevallier.—p. 927.
*Nerve Regulation of Epinephrin Secretion. Tournade et al.—p. 933.
*Arterial Pressure and Epinephrin Secretion. A. Tournade and M. Chabrol.—p. 934.
*Thyroid and Quinin. Kroszczynski and Modrakowski.—p. 939.
*Skin Test for Meningococcus. M. Erlich et al.—p. 943.
*Etiology of Scarlet Fever. H. Brokman et al.—p. 944.
*Pathogenesis of Scarlet Fever. H. Brokman et al.—p. 946.
Action of Insulin and Muscle Tissue on Formation of Glucose. C. Lundsgaard and S. A. Holbøll.—p. 957.
Autoreinfection with Hookworm. J. Bacigalupo.—p. 966.
*Pituitary Gland and Glycemia in Toads. B. A. Houssay et al.—p. 967.
Action of Insulin on Toads. B. A. Houssay et al.—p. 968.
Polyuria from Removal of Pituitary in Toads. Houssay et al.—p. 969.
Glucose of Plasma and Blood Corpuscles in Animals. O. Pico-Estrada and V. Morera.—p. 971.

Cholesteremia of Tuberculous Women During Gestation.—The cholesterol content of the blood increases in normal pregnancy, while in progressing tuberculosis it falls below normal. These conflicting tendencies were evident in Salomon and De Potter's research on fifty-eight tuberculous pregnant women. The cholesteremia was low in the progressing cases and was high with a nonactive process. In the postpartum period, hypercholesteremia was manifest in ten of twelve with nonactive tuberculosis, while hypocholesteremia was marked in eight of ten with an active process. This fact may indicate exacerbation of the tuberculous infection, and therefore throw light on the prognosis.

Cholesteremia and Arterial Pressure in the Tuberculous.—The same authors assert further that no connection seemed to exist between the content of cholesterol in the blood and the arterial pressure.

Immunization Against Tetanus by Anatoxin with Pulverized Tapioca.—Ramon and Descombey injected horses with gradually increasing doses, from 10 to 100 c.c., of tetanus anatoxin mixed with pulverized tapioca. After the last injection, 1 c.c. of the horse's serum neutralized from 10,000 to 50,000 guinea-pig lethal doses of toxin, while 1 c.c. of serum from horses injected with the same doses of anatoxin without tapioca neutralized only from 300 to 1,000 lethal doses. The serum from horses, hyperimmunized with 125 to 350 c.c. of toxin and tapioca mixture, contained from 10,000 to 25,000 units of antitoxin per cubic centimeter after three months, while in the controls only 1,000 or 1,500 units were found after four or five months. The subcutaneous mode of injection appeared to be most effectual.

The Blood in Typhus.—Kossovitch found in the blood of 138 patients with typhus a shifting to the left, by Arneth's formula, particularly marked in grave cases.

Recuperation of Sight After Resection of Optic Nerve in Tritons.—Matthey severed intracranially the optic nerves in two tritons. Both recovered vision thereafter. There was microscopic evidence of regeneration of these nerves, with extension into the corresponding cerebral hemisphere.

Action of Lung on Coagulability of Blood.—Roger and Binet conclude from their research on dogs that the coagulability of blood becomes reduced during its passage through the lung.

Experimental Pott's Disease in Rabbit.—Chevallier inoculated the eye of a rabbit with material from an erythema nodule of the Hutchinson type. A nodule formed in the iris and cornea and paraplegia developed by the fortieth day. Three days later the rabbit was killed. Two abscesses in the third and fourth lumbar vertebrae had caused the compression of the spinal cord. Histologic examination showed tuberculous osteitis. A large number of tubercle bacilli, associated with cocci, were present in the cheesy pus. The organs and glands appeared normal. Chevallier believes it is the first case on record of induced Pott's disease.

The Nerves Controlling Epinephrin Secretion.—Tournade and his co-workers' study on dogs in parabiosis apparently proved that the nerve fibers regulating the epinephrin secretion pass from the medulla oblongata and pons to the spinal cord. Thence, by the way of the anterior roots, from the fourth thoracic to the first lumbar, they join the splanchnic nerves, thus reaching finally the chromaffine elements of the suprarenals.

Effect of Arterial Pressure on Epinephrin Secretion.—Tournade and Chabrol relate that arterial hypotension seems to enhance vasoconstriction and the secretion of epinephrin in dogs, while hypertension inhibits them.

Antagonistic Action of Thyroid Extract and Quinin.—Kroszczynski and Modrakowski say that their findings in tadpoles confirmed the opposite action of thyroxin and quinin. This supplies an experimental basis for the benefit from quinin in exophthalmic goiter.

An Intradermal Meningococcus Test.—Erlich and his co-workers injected intradermally eighty-two subjects, aged from 1 to 20 years, with the toxin from cultures of meningococci A or B. The reaction was positive in forty-five, negative in twenty-eight and uncertain in nine. Administration of a nonspecific serum did not influence the positive response. The principle is the same as in the Schick, Brokman and Dick reactions.

Etiology of Scarlet Fever.—The serum from rabbits immunized with Caronia's antiscarlet fever vaccine seemed to agglutinate scarlet fever streptococci at 1:640, and even 1:2,560. The same was noted with organs of guinea-pigs in the Tarozzi-Noguchi medium. No agglutination of scarlet fever streptococci occurred with serum from rabbits vaccinated with the same medium, without organs. Brokman and his co-workers inoculated fourteen subjects with a positive Dick test with Caronia's vaccine, and four with the organ medium. The test became negative in all. Thus the induced antibodies are not specific, but heterogenous. They are produced by the antigen from the organs in this medium.

Pathogenesis of Scarlet Fever.—Brokman and his co-workers say that the Dick test applied in 600 subjects confirmed the individual sensitiveness to the toxin of the scarlet fever streptococcus. The sensitiveness varies with the age of the subject. The specific antitoxin was present in ten of eleven scarlet fever convalescents. Only those with a positive Dick test contracted the disease (six). In two scarlet fever patients the eruption skipped the area of a positive Dick test, previously made. From 425 to 800 skin units of toxin induced immunity in thirty-three out of forty-one inoculated. Twenty-four of thirty-four subjects were immunized with Ramon's antitoxin. The Dick and the Villa tests made simultaneously in fifty subjects, elicited a positive reaction to both only in three. With the Italian vaccine (three injections of 2 c.c.), a positive Dick test became negative in eight of fourteen cases. Four children were immunized with the Tarozzi-Noguchi culture medium used by the Italians. The positive Dick reaction became negative in two. This may suggest some biologic relationship between the scarlet fever hemolytic streptococcus and the Di Cristina germ.

Influence of Pituitary Gland on Glycemia in Toads.—Houssay, Mazzocco and Rietti found hypoglycemia and reduction of the liver glycogen in toads after removal of the whole pituitary gland or one lobe, as well as after injury to the infundibulum. The muscle glycogen did not seem to decrease in these animals.

Lyon Chirurgical

22: 597-756 (Oct.) 1925

Operation for Abscess in the Liver. O. Cignozzi.—p. 597.
*Multiple Gastric Ulcers. X. Delore et al.—p. 620.
*Invagination After Gastro-Enterostomy. J. G. Kopp.—p. 664.
Complicated Fracture of Lumbar Vertebra. J. Creyssel.—p. 678.

Multiple and Recurring Forms of Ulcer of the Stomach.—Delore, Mallet-Guy and Vachey distinguish three types of the *maladie ulcéreuse;* first, a type in which two or more ulcers appear successively or simultaneously in a patient not treated previously by operation. This is the "spontaneous double ulcer." The second type is characterized by an ulcer appearing in another region of the stomach, when the first ulcer had healed after an operation. This is the "bascule ulcer." Recurrence of the ulcer at the site of the first ulcer, may occur in rare cases. This is the true "recurring ulcer." The clinical diagnosis of a spontaneous double ulcer can hardly be made, except when it is revealed by the roentgen ray. If the two ulcers are close together, extensive resection is indicated. Coexistence of an ulcer in the pylorus with another in the body of the stomach, with absence of stenosis, suggests gastropylorectomy, or in certain cases excision of the ulcer with gastro-enterostomy. A supplementary pylorectomy may be needed if the pyloric ulcer proves rebellious. In stenosis of the pylorus with an ulcer in the lesser curvature, gastro-enterostomy is the treatment of choice. With stenosis both of the pylorus and from hour-glass contraction of the body of the stomach, gastropylorectomy is advisable. This is the most complete indication for an extensive operation.

Retrograde Invagination After Gastro-Enterostomy.—Kopp describes a case of invagination following gastro-enterostomy in a woman, aged 35. Six of the seventeen cases reported to

date had a fatal outcome, because the diagnosis was made late or not at all. Pains and bloody vomiting after gastroenterostomy should suggest possible retrograde invagination of the jejunum. Kopp assumes that this complication occurs more frequently than is clinically noted, owing to spontaneous reduction of the invagination in most cases.

Paris Médical

57: 345-360 (Oct. 31) 1925

Subcutaneous Calcium Calculi. A. Gilbert and L. Pollet.—p. 345.
*Edema of Liver Origin. M. Villaret et al.—p. 353.
*Etiology of Typhus. P. Hauduroy.—p. 356.

Edema of Liver Origin.—Villaret, Bénard and Biancani reiterate that the prognosis of a more or less generalized edema with liver disease is usually grave. The patients present signs of liver insufficiency and most of them soon die, presenting severe jaundice. Roger's experiments proved that the autolysis products from a diseased liver inhibit the excretion of water by the kidneys, and disturb the acid-base and salt balance. These factors tend to increase the absorbing property of the humors and tissues for water, the so-called hydrophilia of the colloids.

Recent Research on Typhus.—Hauduroy discusses the puzzling relations between *Rickettsia prowazeki* and *Proteus X* in connection with typhus. Fejgin has recently reported that guinea-pigs developed the same disease when inoculated with an antiproteus bacteriophage or with typhus virus from typhus patients. Each of these conferred immunity against the other in nearly every instance. He queries whether this rickettsia and the proteus may not be different forms of the same filtrable virus.

Presse Médicale, Paris

33: 1409-1424 (Oct. 24) 1925

*Eosinophil Count in Infections. C. Aubertin and R. Musso.—p. 1409.
*Care of Patient in Stomach Operations. X. Delore et al.—p. 1410.

Do Eosinophils Disappear During Infection?—Aubertin and Musso state that in acute or chronic infections, with neutrophil leukocytosis, the number of eosinophils in the blood is generally unchanged. A notable decrease of eosinophils in certain cases does not always indicate a grave prognosis.

Preoperative and Postoperative Care in Gastric Surgery.—In addition to the usual preparation of the patient, Delore and his co-workers extol the advantages of lavage of the stomach with a hot liquid the day before the operation, or immediately preceding it in emergency cases. They reiterate the necessity for rigorous disinfection of the mouth and teeth, beginning several days before the operation. Repeated injections of physiologic saline or glucose solution may be required in certain cases to combat dehydration. No roentgen-ray examination should be made on the eve of an operation, if not urgent. In the postoperative period, lavage of the stomach may give excellent results in mild gastric hemorrhages and in the vicious circle. With complicating peritonitis, lavage is a useful symptomatic treatment, often inducing marked temporary improvement. Prompt and repeated rinsing out of the stomach may exert a surprising effect in acute postsurgical dilatation of this organ.

Policlinico, Rome

32: 1453-1484 (Oct. 19) 1925

Specific Treatment of Malaria. V. Ascoli.—p. 1453.
Lisfranc Amputation with Mobilized Stump. S. Bile.—p. 1461.
Sympathectomy in Angina Pectoris. G. Pieri.—p. 1462.

Siglo Médico, Madrid

76: 221-244 (Sept. 5) 1925

*Sugar in Local Treatment of Cancer. Vital Aza.—p. 221.
Sodium Citrate in Treatment of Anemia. M. Gómez Fresno.—p. 223.
A Belgian Pioneer in Ophthalmology: F. D'Aguilon. Diaz Caneja.—p. 227.

Sugar in Local Palliative Treatment of Uterine Cancer.—Vital Aza states that the fetid discharge from an inoperable cancer or after radiotherapy can be checked by packing the vagina with cotton impregnated with a mixture of equal parts of saccharose, distilled water and glycerin. In eighteen or twenty days the discharge is no longer fetid and the irritated tissues of the environment heal. He has been applying this treatment for two years, as recommended by Calatayud, and Nogier, Foveau de Courmelles and others have called attention to the value of sugar as it sets up an exosmotic current which washes out the cell detritus. He uses about 30 gm. of the mixture each time, packing the long twist of absorbent cotton entirely into the vagina. The patient can withdraw it in seventeen or eighteen hours. Six or seven of these tamponings improve conditions remarkably, and by the eighteenth day there is scarcely any odor as the cotton is removed.

Archiv für Kinderheilkunde, Stuttgart

76: 241-320 (Oct. 17) 1925

Psychology of Puberty. E. Spranger.—p. 241.
Tuberculin in Whooping Cough. C. Stuhl.—p. 253.
Physical Development in Puberty. H. Aron.—p. 258.
Metabolism in Infants. E. Müller and H. Steudel.—p. 272.
Congenital Lymphangiectatic Edema. A. Hofmann.—p. 285.
*Foreign Body in the Bronchus. D. Klepetář.—p. 287.
Significance of Vitamins in Infant Feeding. P. Reyher.—p. 291.

Foreign Body in the Bronchus.—Klepetář's patient, a child 2½ years of age, aspirated part of a peanut. He had after that symptoms resembling whooping cough. He expectorated the foreign body after being held with the head down.

Beiträge zur klinischen Chirurgie, Berlin

134: 321-482, 1925

Surgery of Vegetative Nervous System. Hahn.—p. 321.
Surgical Treatment of Paralyses. K. Seiffert, Jr.—p. 336.
Goiter in Silesia. H. Herfarth.—p. 364.
*Goiter in Animal Experiments. B. Breitner.—p. 380.
Pneumococcus Peritonitis. Hagedorn.—p. 391.
Treatment of Cholangeitis. Tietze.—p. 396.
Stomach Resection for Exclusion. K. Gütig.—p. 399.
*Bleeding Time in Ulcer and Cancer. H. Harttung.—p. 403.
Cystadenoma of Pancreas. H. Simon.—p. 410.
Chronic Appendicitis. C. Goebel.—p. 413.
*Vaginal Plastics. G. Schubert.—p. 421.
Blastomycetes and Pneumococcus Parotitis. Pendl and Materna.—p. 426.
Fractures of the Spine. H. Nossen.—p. 435.
Sweat Gland Adenomas in Scars. F. Neugebauer.—p. 437.
Ossification of Masseter. C. Partsch.—p. 449.
Subungual Exostoses. E. G. Niecke.—p. 452.
Measuring Climatic Radiation. J. Tichy.—p. 455.
Autovaccines. E. Breitkopf.—p. 458.
Neoplasms and Pyogenic Infection. E. Melchior.—p. 460.
Branchial Fistulas. J. Becker.—p. 470.
Diverticulum of Esophagus. H. Harttung.—p. 473.
Cancer Resembling Lupus. C. Barthels.—p. 480.

Goiter in Animal Experiments.—Breitner considers Blauel and Reich's experiments as an important starting point. They found an accumulation of colloid in the thyroids of rats with stenosis of the trachea. He found that this accumulation did not occur when he removed simultaneously half of the thyroid or when he fed the animal with iodin. On the other hand, when a dog is fed with thyroid or iodin after resection of half of his thyroid (without tracheal stenosis) the loss of colloid from the remaining half—which would otherwise occur—is prevented. It is impossible to make a functional diagnosis from the histology of the goiter: The secretion may be qualitatively inferior (especially in goiter of adolescents). It seems that the iodin gives it its full value.

Bleeding Time in Ulcer and Cancer.—Harttung found that the bleeding time was normal with cancer of the stomach and prolonged with ulcers. Autohemotherapy shortened it.

Construction of Artificial Vagina from the Rectum.—Schubert formed a vagina from the rectum in seventeen women (one death). In three of them the uterus was functioning. He mentions a case operated on by his method by Wagner, with two subsequent normal deliveries.

Deutsches Archiv für klinische Medizin, Leipzig

148: 273-380 (Oct.) 1925

*Gastric Secretion. L. Heilmeyer.—p. 273.
The Pneumonia Relapse. K. Voit.—p. 313.
*Poisoning of Stomach with Acids. K. Sick.—p. 318.
Acute Myeloblastic Leukemia. Kwasniewski.—p. 344.
*Serum Cholesterol in Pernicious Anemia. H. Köhn.—p. 357.
Some Unusual Electrocardiograms. H. von Hoesslin.—p. 372.

Gastric Secretion.—Heilmeyer added 3 c.c. of a 0.5 per cent. solution of indigocarmin to 350 c.c. of water and 18 c.c. of 96 per cent. alcohol. He introduced the mixture into the

stomach after evacuation of the contents, and made a fractional analysis thereafter of the acidity, chlorids and color. The acidity of the pure secretion was determined by a simple equation. It ranged from 0.2-0.4 per cent. in healthy subjects, to over 0.5 per cent. in hyperchlorhydria. The concentration of chlorids was comparatively constant. The method is of value for differentiation between true hyperchlorhydria and hypersecretion—the latter being especially frequent with ulcers, the former in neurotic subjects. He found also that iodin is excreted by the stomach after intravenous injections.

Poisoning of Stomach with Acids.—Sick reports on his histologic and experimental investigations of the gastric sequels of poisoning with mineral acids.

Serum Cholesterol in Pernicious Anemia.—Köhn found in secondary as well as pernicious anemia practically always low values of cholesterol in the serum. This was especially pronounced in the progressive stages of pernicious anemia. Its concentration was in inverse proportion to the gravity of the latter process.

Deutsche medizinische Wochenschrift, Berlin

51: 1725-1766 (Oct. 16) 1925

The Brain in Paralysis Agitans. K. Kleist.—p. 1725. C'cn, p. 1813.
*Birth Injury of Petrous Bone. J. Berberich.—p. 1726.
*Treatment of Dysentery. G. P. Alivisatos.—p. 1728.
*Postencephalitic Character Changes. E. Weidner.—p. 1731.
Art of Prescribing. K. Schübel.—p. 1734. C'cn.
Homeopathy. O. Leeser.—p. 1735.
Autonomic Nerves. E. Schilf.—p. 1737.
*Transmission of Therapeutic Malaria by Anopheles. R. v. Engel.—p. 1738.
Rubber Tube for Aspiration. J. Clemens.—p. 1739.
The Mátéfy Reaction in Pulmonary Tuberculosis. Salzmann.—p. 1740.
Juvenile Neurosyphilis. M. Gumpert.—p. 1741.
Night Sweats in Tuberculosis. Zwerg.—p. 1742.
The Knee-Jerk. P. Prengowski.—p. 1743.
Roentgen Treatment in Gynecology. F. Heimann.—p. 1744. C'cn.
Typhoid in Germany. B. Möllers.—p. 1745.
Venereal Diseases in German Marine. R. Rosner.—p. 1747.
Danger of Suicide as Indication for Abortion. Niedermeyer.—p. 1747.
History of Pathogenic Germs. E. Ebstein.—p. 1748.

Birth Injury of Petrous Bone.—Berberich applied in new-born animals a suction apparatus on the head, and produced typical cephalohematomas as well as intracranial hemorrhages. The changes in the brain corresponded in every respect to those found by Schwartz in 65 per cent. of new-born babies. Those in the petrous bone were identical with Voss' findings in the human bone. This is another confirmation of the grave injury of brain and skull which occurs almost regularly during delivery.

Treatment of Dysentery.—Alivisatos administers by mouth 20-30 drops of a polyvalent vaccine on the first day, 50 drops on the second, and 60-70 drops on the third day—all fractioned in two or more doses. He observed a rapid improvement in 111 out of 117 cases. Only one patient with the Shiga type—the treatment not started till the eleventh day—died twelve hours after the first dose.

Postencephalitic Character Changes.—Weidner describes the changes of behavior after encephalitis. They occur practically only in children, but are so typical that a retrospective diagnosis may be made in cases in which the encephalitis had not been noted. The children try to mix into everything, fight, tell tales on their comrades, run about, and are inclined to sexual delinquencies. The intelligence is apparently intact, but the motor restlessness is a most prominent feature. He recommends phenobarbital—from 0.05 gm. to 0.2 gm. daily—best in the afternoon and evening. Scopolamin (0.5 to 2 teaspoonfuls of a 0.01 per cent. solution) should be given in the morning. The prognosis is bad.

Transmission of Therapeutic Malaria by Anopheles.—Engel was able to transmit malaria from the ninth human passage by anopheles. The blood of the patient had contained gametes.

Deutsche Zeitschrift für Chirurgie, Leipzig

193: 145-432 (Oct.) 1925

*Treatment of Fractures of Neck of Femur. Portwich.—p. 145.
*Sensory Innervation and Bone. E. Sulger.—p. 186.
Nervous System and Regeneration of Bones. W. Felix.—p. 196.
Artificial Esophagus. J. Sebestyén.—p. 238.
*The Exophthalmic Goiter Question. E. Liek.—p. 246.
Thyroid and Other Glands in Exophthalmic Goiter. Holzweissig.—p. 276.
Transpleural Bronchostomy. S. Minkin.—p. 286.
*Peritonitis and Ileus. L. Schönbauer.—p. 295.
Incarceration of Hernia. C. Ritter.—p. 308.
Gallstones and Gastric Secretion. J. Loesal.—p. 325.
*Action of Cathode Rays on Germs. C. von Angerer et al.—p. 330.
Modification of the Meyer-Schlüter Apparatus for Localization of Brain Tumors. W. E. Pauli and E. von Redwitz.—p. 343.
Autohemotherapy of Postoperative Lung Disease. C. Rausche.—p. 349.
Bone Changes with Neurofibromatosis. O. Fliegel.—p. 359.
Epithelization and Transplantation of Veins. K. Reschke.—p. 366.
Circulation After Sympathectomy. J. Sebestyén.—p. 375.
Treatment of Corrosion of Esophagus. J. Alksnis.—p. 378.
Volvulus of Sigmoid Flexure. J. Alksnis and P. Muzeneek.—p. 390.
Lateral Fistulas in the Neck. S. Müller.—p. 401.
Enteroliths. O. Winterstein.—p. 409.
Splenectomy for Torsion of Malarial Spleen. N. N. Nasaroff.—p. 420.
Extirpation of Cancerous Bladder. T. Messtorff.—p. 425.

Conservative Treatment of Fractures of Neck of Femur.—Portwich had only one failure in ten patients with medial fracture of the femoral neck, treated by Whitman's method.

Sensory Innervation and Bones.—Sulger denervated one side of the mandible in dogs. No change of weight or of the structure of the bone occurred within half a year.

Exophthalmic Goiter Question.—Liek emphasizes the significance of the brain in the pathogenesis of exophthalmic goiter. He has scarcely ever encountered a case without a history of some grave psychic trauma. Psychanalysis may help in treatment, in the beginning as well as before and after surgical treatment. He prefers the latter to roentgen therapy except in adolescents. The operation should be made in a favorable phase of the disease. The mental condition of the patient is prognostically more important than the basal metabolism. The intervention should be extensive, but without attempt to get the thymus. He deplores the frequent overlooking of the psychic condition by self-styled "sober thinking" surgeons and attributes it to the loss of mental versatility occurring in every mechanization of mental work. This leads to a sort of self-righteous mandarin attitude, and wrong judgment as to success and failure.

Peritonitis and Ileus.—Schönbauer had in the last three and a quarter years (Eiselsberg's clinic) a mortality of only 11.2 per cent. in eighty-nine cases of perforation peritonitis, against 34.7 per cent. among 164 cases treated previously. He attributes the success to the irrigation of the peritoneum with 1.5 to 3 liters of a solution of pepsin in a 0.3 per cent. solution of hydrochloric acid. The method was however a failure in postoperative peritonitis. This led to an investigation of the mechanism in the latter. Lycopodium contained in enemas was found in the stomach after laparotomies. This indicated that antiperistalsis is a frequent occurrence after laparotomy. Besides this, there is always a peritoneal exudation. The permeability (not resorption) of the intestine is increased, and peptones as well as amino-acids were found in the exudate. The increased antitryptic titer of the blood in ileus patients pointed to the possibility of a poisoning with trypsin. Preliminary injections of trypsin or injection of 300 c.c. of blood from such dogs prevented death in experimental ileus. Small quantities (6 c.c.) of blood from diabetic patients with its high antitrypsin content had the same effect. The method has not been tested in patients because sufficient amounts of such blood were not available until Saxl and Kelen found that a good antitryptic serum may be obtained also by feeding dogs with trypsin.

Action of Cathode Rays on Germs.—Angerer, Pauli and Redwitz found that cathode rays applied at a short distance kill bacteria and spores within a few seconds. They disinfected pus only to a depth of 0.1 mm. The action was also manifest in experimental superficial wounds, which were irradiated immediately after infection.

Jahrbuch für Kinderheilkunde, Berlin

110: 127-252 (Oct.) 1925

*Intestinal Anaerobes in Infants. H. Kleinschmidt.—p. 127.
Adhesive Pericarditis and Cardiolysis in Children. W. Schaefer.—p. 142.
Ammonia Excretion in Infants. K. Klinke.—p. 159.
Sporadic Cretinism. F. Thoenes.—p. 167.
Origin of Bifidus Flora. A. Adam.—p. 186.
*Pathogenesis of Herter's Infantilism. Freise and Jahr.—p. 205.

Intestinal Anaerobes in Infants.—Kleinschmidt investigated the anaerobic microbes in the calcium soap stools of infants. According to Langstein, the light color of these stools is

not due to a deficient secretion of bile, but to the strong reduction of bilirubin. Three to four different species of bacilli were cultivated from every such stool. Fraenkel's gas bacillus, which was present in five out of eight stools, reduced bilirubin constantly. Of the other anaerobic germs, only certain strains, and only in mutual association or combination with colon bacilli, produced urobilin. He did not observe a complete destruction of the bilirubin molecule.

Pathogenesis of Herter's Infantilism.—Freise and Jahr studied the metabolism in two cases of Herter's intestinal infantilism (coeliac disease). They confirm the low utilization of carbohydrates and especially of fat and salts. They found clinically and roentgenologically that this is due to the increased motility of the stomach, small intestine and the proximad part of the colon. After calming of these parts by opium (less by atropin), the utilization became almost normal, together with a remarkable clinical improvement. They conclude that the syndrome is a vegetative neurosis, forming a part of a weakness of the whole nervous system of these children.

Klinische Wochenschrift, Berlin

4: 2041-2088 (Oct. 22) 1925

Sensibility of Abdominal Cavity. M. Kappis.—p. 2041. C'cn, p. 2089.
Obesity and Specific Dynamic Action. H. W. Knipping.—p. 2047.
Improved Serologic Technic. H. Sellheim.—p. 2049.
*Genesis of Epileptic Seizure. F. Georgi.—p. 2053.
*Uhlenhuth's Antituberculosis Serum. H. Fernbach.—p. 2056.
*Chlorids, Hunger and Gastric Secretion. C. Jäkle.—p. 2059.
Tuberculin by Mouth. F. Köstler.—p. 2061.
Specific Dynamic Action of Proteins. O. Göttche.—p. 2062.
Encephalography with Iodized Oil. J. Schuster.—p. 2064.
*Action of Ions and Pituitary on Blood Sugar. E. Kylin.—p. 2068.
*Action of Arsphenamin on Frog's Heart. F. Jacobsohn.—p. 2068.
Sedimentation Test. K. Berliner.—p. 2069.
Chemical Physiology in Teaching. F. Knoop.—p. 2072.
Balneotherapy of Arthritis. Muskat.—p. 2086.

Genesis of Epileptic Seizure.—Georgi examined the signs of stability of blood colloids (sedimentation and fragility of erythrocytes, viscosity, refraction, coagulation, etc.) during hyperpnea. He found remarkable changes which cause him to differentiate between proteinogenic changes of stability (pregnancy, fever, etc.) and ionogenic (in hyperpnea). He attributes the seizure to a coupling of various factors: disturbed metabolism, ionogenic changes of stability of colloids, —especially of the colloids in membranes—and a pathologic change of the cortex.

Uhlenhuth's Antituberculosis Serum.—Fernbach concludes from his experiments that Uhlenhuth's serum, obtained by immunization of cattle with tubercle bacilli, contains tuberculin.

Chlorids, Hunger and Gastric Secretion.—Jäkle finds that the amount of sodium chlorid in the diet does not influence the acidity of the gastric secretion.

Action of Ions and Pituitary on Blood Sugar.—Kylin found that a preliminary injection of potassium chlorid enhances the hyperglycemic action of pituitary extracts. Calcium chlorid lowers it.

Action of Arsphenamin on Frog's Heart.—Jacobsohn found that arsphenamin acts on the frog heart the same way as arsenic or potassium. Its action can be compensated by calcium.

Medizinische Klinik, Berlin

21: 1599-1634 (Oct. 23) 1925

*Treatment of Anal Fissure. F. Pels Leusden.—p. 1599.
Basal Metabolism. W. Arnoldi.—p. 1601.
*Topovaccinotherapy. J. Citron and H. Picard.—p. 1606. C'cn.
Cyst of Common Bile Duct. R. Pamperl.—p. 1608.
*Hemoglobin Resistance in Anemias. T. Wörpel.—p. 1610.
Varix of Longitudinal Sinus. A. M. Marx.—p. 1612.
*Disease of Interlobar Fissure. F. Deutsch.—p. 1614.
Deep Peritonsillar Abscess. W. Haardt.—p. 1615. C'cn, p. 1650.
Oral Murmur from Subclavian Artery. B. Cohn.—p. 1617.
Serology in Dark Field Illumination. Hilgers and Kötzing.—p. 1618.
Dry Insulin. J. Preuss and A. Jacoby.—p. 1619.
Recent Works on Neurology and Psychiatry. K. Singer.—p. 1621.

Treatment of Anal Fissure.—Pels Leusden recommends dilatation of the sphincter under general or local anesthesia.

Topovaccinotherapy.—Citron and Picard trace the history of artificial local immunization—"topovaccinotherapy"—to Wassermann's and Citron's early studies. Yet they employ now vaccines prepared with Besredka's method, and report excellent results in sixty cases of cellulitis, mastitis, osteomyelitis, erysipelas or empyema.

Hemoglobin Resistance in Anemias.—Wörpel determined the time of disappearance of the oxyhemoglobin spectrum after addition of one fourth normal sodium hydroxid to the hemoglobin solution. It ranged from fifty-five to sixty-five seconds in healthy controls and secondary anemia. In eleven of twelve cases of pernicious anemia, the time was prolonged (up to 190 seconds).

Disease of Interlobar Fissure.—Deutsch believes that a pain localized in the right fourth anterior intercostal space, radiating into the axilla and the shoulder region up to the neck, is characteristic of some pathologic process in the interlobar fissure. The fifth intercostal space in the axilla may be tender.

Monatsschrift für Geb. und Gynäkologie, Berlin

71: 1-120 (Oct.) 1925

Obstetric Twilight Sleep. H. Fuchs.—p. 1.
*Self-Help of Child in Delivery? H. Küstner.—p. 14.
Genesis of Metritis Dissecans. K. Fink.—p. 22.
Grave Nosebleed in Pregnancy. H. von Broich.—p. 25.
*Ruptures of the Uterus. H. Heidler.—p. 33.
Virulence of Streptococci. R. Tateyama.—p. 46.
Paravaginal Neuroma. P. Bohnen.—p. 51.
*Patency of the Tubes. D. v. Ott.—p. 58.
Surgery of Tubes in Sterility. F. Unterberger.—p. 63.
Sterility and Salpingostomy. O. Ritter.—p. 70.
Cystic Sarcomas of the Uterus. G. Halter.—p. 82.
Melanosarcoma of Vulva and Hamartoma of Uterus. R. Tauber.—p. 95.

Self-Help of Child in Delivery?—Küstner observed rhythmic extension movements of the head, when putting new-born infants into the position in which they had been born. A slight pressure on the forehead and occiput provokes another type of rhythmic movement. The child presses his face down and raises the occiput, fitting the head better into the space between the hands of the experimenter. He points out that the muscles of the neck are strong in new-born infants. There is an analogy in the chicken, which has to break the shell by movements of the head. It is probable that these reflex movements in the new-born may have aided in the delivery.

Ruptures of the Uterus.—Heidler emphasizes that the labor pains may persist in spite of the rupture of the uterus, unless the fetus is in the peritoneal cavity. He describes nine atypical cases.

Test for Patency of the Tubes.—Ott prefers intraperitoneal injection of a suspension of charcoal to Rubin's method.

Monatsschrift für Kinderheilkunde, Leipzig

31: 1-96 (Oct.) 1925

Insulin in Children. R. Freise and K. Choremis.—p. 1.
*Liver Chemistry in Diarrhea. S. Rosenbaum.—p. 15.
Etiology of Chronic Pyuria. W. Courtin.—p. 24.
Acid Milk Mixtures in Infant Feeding. H. Vogt.—p. 30.
A Tonic Neck Reflex in Infants. O. Tezner.—p. 40.
*The Breslau Children Beginning School. S. Samelson.—p. 44.
Exfoliating Dermatitis of the New-Born. O. Herz.—p. 60.
*Treatment of Congenital Syphilis. C. Stamm.—p. 63.
Causes of Backwardness in Schools. E. Nitsch.—p. 65.
Dilatation of the Heart After Influenza. J. Lukács and K. Waltner.—p 72.
Internal Secretions and Malnutrition in Infants. P. Heim.—p. 74.
"Liver Function Test in Infants." A. Mertz and E. Rominger.—p. 82.

Liver Chemistry in Diarrhea.—Rosenbaum found in infants an accumulation of fat and loss of glycogen in the liver when the diarrhea had entailed considerable dehydration. Both these changes may be prevented by prolonged administration of insulin. Yet this action is not constant, and it does not influence the toxic symptoms.

The Breslau Children Beginning School.—Samelson attributes the inferiority of the "war children" not to underfeeding alone. The wrong qualitative composition of the food played also a rôle. The lack of coal and consequent bad ventilation, the employment of the mothers, with the resulting lack of normal sleep of the children, and many other factors are overlooked by those who attribute everything to the lack of food.

Treatment of Congenital Syphilis.—In treating infants, Stamm had much better results with bismuth preparations than with other methods of treatment for congenital syphilis.

Münchener medizinische Wochenschrift, Munich

72: 1815-1862 (Oct. 23) 1925

Revision of Neuroses. O. Bumke.—p. 1815.
The Rumpel-Leede Phenomenon. Walterhöfer.—p. 1819.
Anhydrosugar in Diabetes. W. Nonnenbruch.—p. 1821.
Preparation of Autovaccines. E. J. Orsós.—p. 1823.
Postoperative Retention of Urine. E. Krieger.—p. 1826.
Paralysis Agitans and Parkinsonism. W. Kühl.—p. 1827.
Heliotherapy. Lissmann.—p. 1830.
Significance of Russia in Medical Geography. H. Zeiss.—p. 1834.
Otogenous Sepsis. H. Malten.—p. 1842.
"Hypnosis and the Vegetative System." R. Laudenheimer.—p. 1843.
"Hard Spots in Muscles." K. Port.—p. 1843.
Camphor Treatment. Gürber.—p. 1844.
Tuberculosis Instruction in Schools. Kayser-Petersen.—p. 1845.
Material in Children's Sanatoriums. R. Ley.—p. 1847.
Leidenfrost as Precursor of Cellular Theory. Hildebrand.—p. 1848.
Michelangelo in the Opinion of Contemporary Physicians. E. Ebstein. —p. 1849.

Wiener klinische Wochenschrift, Vienna

38: 1123-1150 (Oct. 15) 1925

Cholecystography. F. Eisler and W. Nyiri.—p. 1123.
*The Epinephrin Reaction. J. Gottesmann.—p. 1125.
*Emotions and Metabolism. F. Deutsch.—p. 1127.
*Arsphenamin and the Reticulo-Endothelial System. Del Baere.—p. 1130.
Treatment of Hypogalactia. F. Ornstein.—p. 1131.
"Prevention of Hydrophobia in Dogs." J. Schnürer.—p. 1133. Reply. B. Busson.—p. 1134.
Transplantation of Testis. H. Steindl. Supplement.—p. 1-24.

The Epinephrin Reaction.—Gottesmann found constantly from three to eight minutes after subcutaneous injections of 1 c.c. of a 0.1 per cent. solution of epinephrin, a lowering of the diastolic pressure which lasted for hours. This was especially pronounced in patients in whom the systolic pressure showed a marked rise. He denies the possibility of diagnosis of an affection of the kidney vessels by this test. He prefers the subcutaneous injection to the intravenous.

Emotions and Metabolism.—Deutsch used hypnosis to induce emotions of fright. It increased the respiratory metabolism except in one case in which the fright produced a collapse. The metabolism was considerably lowered then.

Arsphenamin and the Reticulo-Endothelial System.—Del Baere found that an intravenous injection of neo-arsphenamin retards the time of disappearance of injected congo red from the blood. He concludes that it blocks the reticulo-endothelial cells.

Zeitschrift für Tuberkulose, Leipzig

43: 345-440 (Oct.) 1925

*Tuberculosis Infection in Physicians and Nurses. Kirchner.—p. 345.
The Tuberculous Focus. A. Jesionek.—p. 355. C'en.
*Chemistry of Tubercle Bacilli. H. Popper and J. Warkany.—p. 368.
Besredka's Test. E. Guth.—p. 372.
Granules of Tubercle Bacilli. W. A. Lubarski.—p. 375.
"Pulmonary Tuberculosis in Lithuania." Kogan.—p. 379. Reply. Kairiukschtis.—p. 380.
The Climatologic Congress at Davos. T. Janssen.—p. 380.
Teaching Social Hygiene. O. Keiner.—p. 383.

Tuberculosis Infection in Physicians and Nurses.—Kirchner finds that a transmission of tuberculosis to physicians or nurses is rare in modern hospitals. It occurs if the physician or nurse is not always conscious of the danger, and if the patients are not instructed.

Chemistry of Tubercle Bacilli.—Popper and Warkany found 1.1 per cent. of tryptophan and 1.4 per cent. of tyrosin in tubercle bacilli. There was no difference between the strains grown in bouillon or in a synthetic medium containing asparagin. Consequently the tubercle bacilli are able to produce aromatic amino-acids (cyclopoiesis) like higher plants.

Zeitschrift für urologische Chirurgie, Berlin

18: 237-337 (Oct. 20) 1925

*Essential Hematuria. J. Gottlieb.—p. 237.
Kidney Stones. J. Hellström.—p. 248.
Tumors of Spermatic Cord and Epididymis. K. Fritzler.—p. 271.
*Congenital Diverticula of the Bladder. L. Lurz.—p. 278.
*Pregl's Kidney Function Test. F. Ody.—p. 300.

Essential Hematuria.—Gottlieb denies the existence of "essential hematuria." He prefers the term "bleeding from a small focus."

Congenital Diverticula of the Bladder.—Lurz finds that only the predisposition is congenital. The diverticulum is of the pulsion type, and localizes at points where the musculature is weak. He reports an instance of practically the same condition in father and son. The pressure in the bladder is higher than in the diverticulum.

Pregl's Kidney Function Test.—Ody shows that Pregl's kidney function test, as recommended by Haberer, is of little, if any use. Its only value is in the auxiliary method of determining the specific gravity of urine in a small portion.

Zentralblatt für Chirurgie, Leipzig

52: 2401-2464 (Oct. 24) 1925

Treatment of High Intestinal Fistulas. R. Pamperl.—p. 2402.
*Resection of Choroid Plexus in Epilepsy. E. Pólya.—p. 2404.
*Antipepsin in Gastric Ulcer. Hilarowicz and Mozolowski.—p. 2410.
"Inferiority" of Scar Tissue. W. Wolf.—p. 2414.
Primary Healing. J. Vigyázó.—p. 2415.

Resection of Choroid Plexus in Epilepsy.—Pólya's patient was a boy, suffering from epilepsy due to a posttraumatic cyst. He opened the cyst, tore off a piece of the choroid plexus, and the patient recovered without a fistula.

Antipepsin in Gastric Ulcer.—Hilarowicz and Mozolowski find that the antipeptic action of the blood serum is due only to its buffer content which changes the hydrogen ion concentration of the pepsin solution. They conclude that there is no antipepsin.

Zentralblatt für Gynäkologie, Leipzig

49: 2321-2384 (Oct. 17) 1925

Physiology of Fallopian Tube. F. von Mikulicz-Radecki and W. Nahmmacher.—p. 2322.
*Tubal Sterilization. B. Waser.—p. 2327.
Uterine Cancer from Heterotopic Epithelium. C. Becker.—p. 2333.
Sterilization in Anemia of Pregnancy? F. C. Hilgenberg.—p. 2336.
Two Rare Malformations. R. Mandelbaum.—p. 2338.
Amputation of Uterus in Prolapse. M. Samuel.—p. 2343.
Tumor of Placenta. L. von Toldy.—p. 2348.
Coiling of Cord Impeding Version. G. Maroudis.—p. 2351.

Tubal Sterilization.—Waser reports on 225 sterilizing interventions using the so-called Madlener method (crushing the tube with an enterotribe and ligation). There was only one failure. The indications for the operation in this case had been the exaggerated erotic tendencies of the perhaps feeble-minded girl. She had an extra-uterine pregnancy eight years later. In spite of the failure in this case, he is convinced that the method is safe, if correctly performed. It had been described by Friedemann four years before Madlener.

Časopis lékařů českých, Prague

64: 1501-1536 (Oct. 17) 1925

*Calculi in Lower Part of Ureter. K. Neuwirt.—p. 1501.
*Pituitary Tumor in Pregnancy. V. Vejdovský.—p. 1504.
*Compression of the Duodenum in Enteroptosis. V. Novák.—p. 1507.
Blood Lipase and Fatty Liver in Depancreatized Dogs. I. Mačela.—p. 1512.
*Action of Trypsin on Insulin. I. Mačela.—p. 1515.
Loose Bodies in Joints. V. Brezovník.—p. 1518. C'en.
Spontaneous Remissions of General Paralysis. O. Janota.—p. 1522.
Measuring Conductivity and Capacity of Tissues. Podrouzek.—p. 1524.
*Treatment of Tetanus. E. Rychlík.—p. 1524.
*Periarterial Sympathectomy. V. Novák.—p. 1528. Begun, p. 1492.

Calculi of Lower Part of Ureter.—Neuwirt reports on eight cases. In each one a different endovesical method was used for removal of the calculus. He also mentions his former advice to try anesthesia of the renal nerves (Kappis' method or paravertebral).

Pituitary Tumor in Pregnancy.—Vejdovský's patient had symptoms of a pituitary tumor, which became grave during a pregnancy. Roentgen therapy improved her vision and cured the headaches. The termination of the pregnancy (healthy child) also contributed to the favorable outcome.

Compression of the Duodenum in Enteroptosis.—Novák observed five cases of chronic compression of the lower part of the duodenum by the root of the mesentery in splanchnoptosis. The roentgenologic diagnosis is easy. If conservative treatment fails, duodenojejunostomy (preferably inframesocolonic) is indicated.

Action of Trypsin on Insulin.—Mačela confirms Epstein's findings on the reversibility of the inactivating action of

trypsin on insulin. The optimum of the reaction was between p_H 2 and 3, which is identical with the hydrogen ion concentration of Lilly's insulin. His findings differ from Epstein's in the absence of spasms after the injection of the reactivated insulin. Besides this, the blood sugar never fell below 0.045 per cent.

Treatment of Tetanus.—Rychlík treats tetanus by intraspinal injections of 0.12 gm. of procain and 3 c.c. of specific antiserum. One of four patients recovered practically immediately; two died. He had perfect results with the injection of procain in nine cases of eclampsia.

Periarterial Sympathectomy.—Novák obtained good results by simple opening of the sheath of the artery and freeing it from inflammatory adhesions.

Nederlandsch Tijdschrift v. Geneeskunde, Amsterdam

2: 1751-1858 (Oct. 17) 1925

Medical Education in Europe as Seen by an American. G. van Rijnberk. —p. 1752. C'tn.
*The Sippy Treatment for Gastric Ulcer. J. Schrijver.—p. 1757.
*Experimental Electrocardiography. S. de Boer.—p. 1773.
Progress in Diagnosis of Cavities. Marsman and Siemens.—p. 1785.
Juvenile Muscular Dystrophy on Basis of Congenital Syphilis. Bolten. —p. 1792.
Case of Scurvy with Hemorrhage in Spinal Cord. Prakken.—p. 1796.

The Sippy Treatment of Gastric Ulcer.—Schrijver declares that gastric ulcer is diagnosed far too frequently where it is nonexistent, and that operative treatment is applied too often without the correct indications. The "Sippy cure" is the reaction from all this, but he thinks it is irrational and is more liable to aggravate conditions than improve them, as overcompensation may upset the entire digestive process, and the excess of alkali favors formation of calculi in the kidneys. Schrijver's own method of treating gastric ulcer has proved its usefulness, he says, in years of experience in his own and others' practice, and he explains the reasons for its superiority over other dietetic methods. It consists of bed rest, systematic feeding with milk from 8 a. m. to 10 p. m., a glass an hour, slowly sipped, to a total of 3 or 3.5 liters. Lime water is mixed with the milk, and sometimes a little alkali is given besides. After all bleeding and tenderness have subsided, a milk gruel is allowed three times a day. Our ignorance of the actual cause of gastric ulcers and the occasional extent and intensity of the lesion limit internal treatment, but he insists that his method accomplishes all that can be expected of nonsurgical treatment. He argues that the acid is not the only factor concerned in production of gastric ulcer, and that the acidity found when the ulcer has developed may be quite different from what existed as the ulcer started. Sippy stated that the acidity was within or below normal range in 50 per cent. of his cases. Ulcers on the skin sometimes are as refractory and tenacious as gastric ulcers; the trouble here is from an insufficient blood supply and this may be a factor also in a gastric ulcer. With Schrijver's method, he adds, the bleeding and the pain subside as if by magic, and the patients gain in weight. The stomach gets a rest between the milk feedings which is more complete, he says, than if no food were given at all. The course seldom requires as long as two weeks.

The Ventricle Electrogram in the Frog Obtained by Direct Derivation.—De Boer describes research which sustains the interference theory, and explains Lewis' contradictory findings. He says there is no evidence to date which proves that Purkinje's fibers transmit the impulse ten times as fast as the muscle of the ventricle wall.

Vestnik Microbiologii i Epidemiologii, Saratov

4: 3-118, 1925. Partial Index

Pathogenic Import of Lambliasis. V. Gaivoronsky.—p. 43.
Present Status of Epidemic Jaundice. V. Yakimoff.—p. 50.
*Experimental Gonococcus Ophthalmia. E. Korobkova.—p. 72.
Morphology of Malaria Plasmodia. I. Ioff.—p. 77.
*Effect of Air and Glycerin on Fixed Virus. N. Griaznoff.—p. 83.

Experimental Gonococcus Ophthalmia in Rabbits and Guinea-Pigs.—Korobkova introduced one drop of a 30 or 75 per cent. solution of ox gall in the conjunctival sac of both eyes in rabbits and guinea-pigs. A gonococcus emulsion was instilled in one eye of the animal four hours later. A pronounced conjunctivitis was manifest the next day and keratitis the third day, soon followed by ulceration of the cornea. In the mild cases, the ophthalmia ran its course in twelve or fourteen days, and entirely disappeared in two or three weeks. The lesions were graver in rabbits, causing partial blindness in some of them. Only five of twenty rabbits and three of five guinea-pigs resisted the inoculation. The infection did not induce immunity either in the eye involved or in its sound mate.

Action of Air and Glycerin on Fixed Virus.—Griaznoff draws from his experiments the conclusion that a rapid or slow desiccation does not reduce the virulence of fixed virus, if the presence of oxygen can be excluded. Under good aëration the fixed virus may lose its virulence within three or four days, even in a humid environment. Glycerin conserves the fixed virus in so far as it protects it against contact with the air oxygen. This is the reason why fixed virus can be conserved likewise in olive oil, agar and gelatin.

Norsk Magazin for Lægevidenskaben, Oslo

86: 1045-1172 (Oct.) 1925

*Sadistic Erotic Murder? F. Harbitz and R. Vogt.—p. 1045.
*"Unfinished Business." H. A. Dedichen.—p. 1056.
Congenital Stenosis of the Aorta (Sudden Death at Age of 43). G. Lützow-Holm.—p. 1066.
Idem in Three Adults. E. H. Hansteen.—p. 1073.
*Influence of Age on Childbearing. G. Schaanning.—p. 1075.
*Operative Treatment of Gastric and Duodenal Ulcer. C. R. Bull. Supplement.—pp. 1-213.

Murder with Extreme Mutilations.—Harbitz and Vogt describe a murder case with sadistic erotic features. The murderer was under the influence of alcohol at the time, and had only the slightest and vaguest remembrance of what had happened, but this excluded the assumption of unconsciousness. The woman's clothes and body were slashed, and chunks cut out, but the hymen was not torn and the microscope showed no spermatozoa in the vagina. The question was whether the young man was conscious of his actions that night or not. Nothing suggesting atypical reactions to alcohol had ever been noted before, nor before the murder that night. He burned some of his bloodstained clothing—including his underdrawers—and put some to soak. A bunch of the woman's hair was found inside his trousers, and he said he had a vague remembrance of pulling out the hair and stuffing it into the opening in his trousers. He was given a ten year prison sentence.

Unsolved Problems.—Dedichen refers among others to the treatment of habitual drinkers and addicts, from the standpoint of society. Their addiction is a sign of mental disease, and he pleads for having the mentally diseased given proper treatment the same as those with any other disease.

Influence of Age on Childbearing.—Schaanning relates that of 3,457 normal primiparas, 46.8 per cent. of those aged 41 to 45 had to be delivered artificially; 27 per cent. of those between 31 to 35, and 3 per cent. of those of 17 to 20. The mortality of the children in the same age groups was 12.9; 3.08 and 1.38 per cent. Breech presentations occurred in 7.7 to 2.6 per cent., and rupture of the tentorium in two of 2,419 childbirths under 30 and in eleven of 1,012 above 30. Elderly primiparas should be classed as possible cesarean section cases from the start. The wish for a living child may sometimes decide the question. In the last series of seventy-three cesarean sections, none of the women died, and all but 2 per cent. of the children were saved.

Operative Treatment of Chronic Gastric and Duodenal Ulcer.—Bull gives a bibliography of 210 titles in concluding his 213 page analysis of the ultimate outcome in ninety-four cases, including sixteen resections. A long English summary and sixteen roentgenograms complete the article. He insists that gastro-enterostomy is generally followed by the healing of the ulcer. The new outlet should be made in the very lowest point and on the right side to utilize the force of gravity. No instance of cancer from a simple ulcer was known. A recurring or new ulcer developed in 6.5 per cent. after gastro-enterostomy and in 18.5 per cent. after resection, and a peptic ulcer in 1.3 per cent. after gastro-enterostomy; none after resection.